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STRENGTH OF ALCOHOLIC MENSTRUA, REFERRED TO COMMERCIAL ALCOHOL AS A STANDARD.

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Most of the existing tables which give the alcoholic strength of distilled spirits adopt absolute alcohol as the basis for all computations. Many calculations in practice, however, would be greatly simplified by adopting the stronger alcohol of the pharmacopœia, which coincides nearly with commercial alcohol, as a standard. Among the problems of most frequent occurrence in practice are the estimation of the commercial value of spirit of a given density, or the preparation from commercial alcohol of a menstruum which shall contain a given proportion of alcohol, by volume or by weight.

While there are many pharmacists who will adopt at once the practice of weighing alcohol, when the pharmacopœia so directs, there are many others who will find it still convenient to follow their accustomed practice of measuring it, and some even, I have no doubt, will go so far as to translate for practical use the weights of the new formulas into volumes. Partly to accommodate such, but chiefly because alcohol is still bought and sold by the gallon, and not by the pound, I have adopted volume rather than weight as the central idea of the accompanying tables. Hence, for commercial alcohol I have used the expression 94 per cent. alcohol, even where weight rather than volume is immediately under consideration. The expression commercial alcohol is open to objection, inasmuch as the commercial article is not of uniform strength.

The use of the tables is obvious without elaborate explanation.

A spirit of any desired strength may be made, of course, by putting into a graduated receiver the required amount of alcohol (of commerce) and adding water to make up the desired volume. Where accuracy is not aimed at this plan commends itself by its simplicity, but unless time is given for the mixture to cool, the resulting spirit will be too

strong. It is true that in practice this error offsets that arising from deficiency in the strength of the commercial spirit, but where exactness is desired neither error must be allowed to take its chance of correction in this way. Hence, in the table there will be found the proportion by volume—or by weight, as the case may be—of water that should be added to a given volume of alcohol of 94 per cent. (at 60°F.) to produce any required mixture.

Even where the fluids are weighed, it is often desired to make up a certain volume of menstruum, and it is to facilitate the calculation in such cases that the fourth column in the table is added. It is required, *e. g.*, to make one liter of a mixture which shall contain 25 per cent. by weight of absolute alcohol. By the table it appears that such a mixture will consist of about 700 cc. of distilled water and 323 cc. of 94 per cent. alcohol. The equivalent of the first may be taken as 700 grams; that of the latter is given in the table as 265 grams. [The figures given are obtained from the table, of course, by interpolation, but if such a trifling mathematical operation seem formidable to any, the nearest figure in the table may be used as giving a close approximation to the desired amounts.]

Correction for Temperature.—If mixtures of alcohol and water are to be made by volume at a temperature above or below 60°F., a correction must be made, the volume of the alcohol being increased by $\frac{1}{10}$ of 1 per cent. for each 27°F. in excess of 60°, or diminished in a similar ratio if below 60°.

Specific Gravity at 60°F.	100 Volumes contain		Weight of 94 per ct. Alcohol in Col. II.	Per cent. by weight of 94 per cent. Alcohol.	100 Vols. contain Absolute Alcohol (Vols.)	Per cent. by weight of Absolute Alcohol.
	Alcohol of 94 p. c. (Vol.)	Water. (Vol.)				
·9986	1·	99·04	0·82	·82	·94	·75
·9972	2·	98·08	1·64	1·65	1·88	1·50
·9958	3·	97.12	2·46	2·47	2·82	2·25
·9945	4·	96·17	3·28	3·30	3·76	3·00
·9933	5·	95·23	4·10	4·13	4·70	3·76
·9920	6·	94·28	4·92	4·96	5·64	4·53
·9908	7·	93·34	5·74	5.79	6·58	5·27
·9897	8·	92·41	6·56	6·63	7·52	6·02

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	Alcohol of 94 p. c. (Vol.)	Water. (Vol.)				
·9884	9·	91·46	7·38	7·48	8·46	6·79
·9874	10·	90·54	8·20	8·31	9·40	7·56
·9863	11·	89·61	9·03	9·16	10·34	8·32
·9852	12·	88·67	9·85	10·00	11·28	9·09
·9842	13·	87·75	10·67	10·84	12·22	9·86
·9832	14·	86·82	11·49	11·69	13·16	10·63
·9821	15·	85·90	12·31	12·53	14·10	11·40
·9811	16·	84·98	13·13	13·38	15·04	12·17
·9802	17.	84·05	13·95	14·23	15·98	12·94
·9793	18·	83·16	14·77	15·08	16·92	13·72
·9784	19·	82·25	15·59	15·93	17·86	14.49
·9775	20.	81·34	16·41	16·79	18·80	15·27
·9766	21·	80·43	17·23	17·64	19·74	16·05
·9756	22.	79·51	18·05	18·50	20·68	16·83
·9746	23·	78·59	18·87	19·36	21·62	17·60
·9736	24·	77·67	19·69	20·22	22·56	18·39
·9726	25·	76·74	20·52	21·09	23·50	19·18
·9717	26·	75·83	21·34	21·96	24·44	19·97
·9707	27·	74·91	22·16	22·83	25·38	20·75
·9697	28·	73·99	22·98	23·70	26·32	21·55
·9687	29·	73.07	23·80	24·57	27·26	22·34
·9677	30·	72·15	24·62	25·44	28·20	23·13
·9666	31·	71·22	25·44	26·32	29·14	23·93
·9656	32·	70·30	26·26	27·20	30·08	24·73
·9645	33·	69·37	27·08	28·08	31·02	25·53
·9634	34·	68·44	27·90	28·96	31·96	26·33
·9623	35·	67·51	28·72	29·85	32·90	27·14

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	Alcohol of 94 p. c. (Vol.)	Water. (Vol.)				
·9610	36·	66·56	29·54	30·74	33·84	27·95
·9597	37·	65·61	30·36	31·63	34·78	28·76
·9585	38·	64·67	31·18	32·53	35·72	29·58
·9572	39·	63·72	32·00	33·43	36·66	30·40
·9559	40·	62·77	32·82	34·33	37·60	31·22
·9545	41·	61·81	33·64	35·24	38·54	32·05
·9531	42·	60·84	34·47	36·16	39·48	32·88
·9516	43·	59·87	35·29	37·08	40·42	33·71
·9501	44·	58·90	36·11	38·01	41·36	34·54
·9486	45·	57·93	36·93	38·93	42·30	35·39
·9470	46·	56·95	37·75	39·86	43·24	36·24
·9454	47·	55·97	38·57	40·80	44·18	37·11
·9438	48·	54·99	39·39	41·74	45·12	37·96
·9421	49·	54·00	40·21	42·68	46·06	38·81
·9404	50·	53·01	41·03	43·63	47·00	39·67
·9387	51·	52·02	41·85	44·58	47·94	40·54
·9369	52·	51·02	42·67	45·54	48·88	41·41
·9351	53·	50·02	43·49	46·51	49·82	42·29
·9333	54·	49·02	44·31	47·47	50·76	43·17
·9315	55·	48·02	45·13	48·45	51·70	44·06
·9296	56·	47·01	46·05	49·44	52·64	44·95
·9277	57·	46·00	46·77	50·42	53·58	45·85
·9258	58·	44·99	47·59	51·42	54·52	46·75
·9239	59·	43·97	48·52	52·42	55·46	47·66
·9219	60·	42·95	49·24	53·42	56·40	48·57
·9199	61·	41·93	50·06	54·42	57·34	49·49
·9179	62·	40·91	50·88	55·43	58·28	50·42

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	Alcohol of 94 p. c. (Vol.)	Water. (Vol.)				
·9158	63·	39·88	51·70	56·45	59·22	51·36
·9138	64·	38·86	52.42	57·47	60·16	52·31
·9117	65·	37·83	53·34	58·51	61·10	53·19
·9095	66·	36·79	54·16	59·56	62·04	54·15
·9073	67·	35·75	54·98	60·60	62·98	55·10
·9052	68·	34·72	55·70	61·65	63·92	56·05
·9030	69·	33·68	56·52	62·73	64·86	57·02
·9009	70·	32·65	57·34	63·78	65·80	57.98
·8986	71·	31·60	58·26	64·83	66·74	58·96
·8963	72·	30·55	59·08	65·92	67·68	59·94
·8941	73·	29·51	59·90	67·00	68·62	60·92
·8818	74·	28·46	60·72	68·10	69·56	61·92
·8895	75·	27·40	61·55	69·20	70·50	62·91
·8871	76·	26·34	62·37	70·31	71·44	63·93
·8847	77·	25·28	63·19	71·43	72·38	64·94
·8822	78·	24·21	64·01	72·56	73·32	65·97
·8799	79·	23·18	64·83	73·68	74·26	66·99
·8774	80·	22·09	65·65	74·82	75·20	68·04
·8749	81·	21·02	66·47	75·97	76·14	69·08
·8724	82·	19·95	67·29	77·13	77·08	70·13
·8699	83·	18·88	68·11	78·30	78·02	71·20
·8673	84·	17·79	68·93	79·48	78·96	72·27
·8648	85·	16·73	69·75	80·66	79·90	73·35
·8622	86·	15·65	70·57	81·85	80·84	74·43
·8597	87·	14·58	71·39	83·05	81·78	75·51
·8570	88·	13·49	72·21	84·27	82·72	76·63
·8542	89·	12·39	73·03	85·51	83·66	77·74

Specific Gravity at 60°F.	100 Volumes contain		Weight of 94 per ct. Alcohol of Col. II.	Per cent. by weight of 94 per cent. Alcohol.	100 Vols. contain Absolute Alcohol (Vols.)	Per cent. by weight of Absolute Alcohol.
	Alcohol of 94 p. c. (Vol.)	Water. (Vol.)				
·8513	90·	11·28	73·85	86·75	84·60	78·88
·8486	91·	10·19	74·67	87·99	85·54	80·02
·8455	92·	9·05	75·50	89·25	86·48	81·19
·8429	93·	7·97	76·32	90·54	87·42	82·33
·8400	94·	6·86	77·14	91·83	88·36	83·50
·8368	95·	5·72	77·96	93·15	89·30	84·71
·8338	96·	4·60	78·78	94·48	90·24	85·91
·8306	97·	3·46	79·60	95·83	91·18	87·14
·8274	98·	2·32	80·42	97·20	92·12	88·38
·8240	99·	1·16	81·24	98·59	93·06	89·65
·8206	100·	0·00	82·06	100·00	94·00	90·93

CHEMICAL NOTES.

By Prof. Samuel P. Sadtler, Ph.D.

Inorganic Chemistry.—*Commercial Manufacture of Oxygen.*—It is said that MM. Brin have greatly improved Boussingault's process for the manufacture of oxygen by alternately peroxidizing and re-oxidizing barium oxide. The material employed, after being re-used 400 times, was found not to be deteriorated. MM. Brin calculate on being able to supply oxygen on the large scale at 12 to 15 centimes per cubic meter.—*Les Mondes* and *Eng. Chem. News*, 45, p. 125.

Production of Active Oxygen out of Hydrogen Peroxide.—Moritz Traube has summarized the results of a lengthy investigation upon the development of active oxygen as follows:

1. Palladium charged with hydrogen, when shaken up with water and oxygen (air) yields immediately and abundantly hydrogen peroxide, a matter which has been hitherto overlooked.

2. The oxidizing action of hydrogenized palladium in the presence of oxygen and water arises not directly from the palladium itself, but almost exclusively from the hydrogen peroxide developed.

3. In one case only is the oxidizing action of hydrogenized palladium in the presence of water and oxygen different from that of hydrogen peroxide. While hydrogen peroxide does not turn a mixture of potassium iodide and starch blue, hydrogenized palladium and oxygen bring about a rapid change to blue color. This is because the palladium in this case brings about a transfer of the oxygen from the hydrogen peroxide to the potassium iodide.

4. Contrary to the views of Hoppe-Seyler, I have found that nascent hyrogen is not able to develop active oxygen by splitting the oxygen molecule.

5. The common development of hydrogen peroxide in oxidation processes is no proof of the simultaneous presence of the active oxygen atom, as the peroxide is never formed by the oxidation of water, by means of an active oxygen atom, as has been hitherto assumed. In every oxidation process it results as a consequence of a reduction.

If, for instance, zinc be shaken up with water and oxygen, we obtain, as is known, along with zinc hydrate, hydrogen peroxide. My experiments show, however, that in this case there is no active oxygen formed, and that the molecule of oxygen is not split at all, but rather the molecule of water, the oxygen of which unites with the zinc to form zinc hydrate, while the hydrogen of the water unites with an oxygen molecule to form hydrogen peroxide, as follows:

$$Zn + 2H_2O + O_2 = Zn(OH)_2 + \begin{matrix} O-H \\ | \\ O-H \end{matrix}$$

Hydrogen peroxide is, according to this view, a compound of an oxygen molecule with two atoms of hydrogen. It may be termed, if we take the analogy of other compounds formed by the taking up of hydrogen, reduced oxygen, and has the same relation to ordinary gaseous oxygen that indigo-white has to indigo-blue.—*Ber. Chem. Ges.*, xv, p. 22.

ORGANIC CHEMISTRY.—*On the Deodorizing of Bad-Smelling Alcohols by Electrolysis.*—Daudin has observed that the unsaturated aldehydes, which give sharp and unpleasant taste to alcohols, particularly butyl- and amyl-aldehyde, are changed into saturated compounds (alcohols) by electrolytic hydrogen developed in the liquid. The amount of alcohol of good taste, too, that can be gotten from a sample is increased from 25 to 30 per cent. For this hydrogenation they use a copper-zinc couple as prepared by Gladstone and Tribe. For

this purpose a zinc plate is hung in a copper solution, where it soon becomes covered with metallic copper, and acquires the property of dissolving with formation of zinc hydrate and liberation of hydrogen. If such an element is brought in contact with dilute alcoholic solutions, of say 40 to 60 per cent., there is immediate absorption of the liberated hydrogen, and the characteristic unpleasant odor of the crude alcohol solution disappears quite rapidly. If now the solution be distilled there is obtained a yield of alcohol 25 to 30 per cent. greater than by the previous methods, and much better tasting. For the technical details of this important method reference must be had to the original communication.—*Bull. de la Soc. Chim.*, 36, p. 273.

Preparation of Lactic Acid.—H. Kiliani has made the important announcement that lactic acid may be readily prepared by the action of potassium or sodium hydrate upon both grape sugar and invert sugar, or cane sugar, after treatment with dilute acids.

In his first paper he gives the following directions: Dissolve one part of grape sugar in one part of water, and then one part of potassium hydrate in one-half part water. The cooled solutions are mixed in such proportion that for every 10 grams of sugar 10 cb. cm. of potash solution is used. In working with larger amounts the alkali must be added slowly and with constant cooling. The mixture is then warmed for several hours in a stoppered flask to about 35°C., and then allow the temperature to rise gradually to 60°C., and digest until the solution no longer reduces Fehling's solution. This will ordinarily take from 6 to 7 hours, heating. In the meantime determine by simple titration how much of a very concentrated sulphuric acid (3 parts pure acid and 1 part water) is needed to neutralize a given amount of the alkali used in the above experiment. After the cooling down of the mixture in the flask a sufficient amount of sulphuric acid is then added to neutralize the alkali that had been used. While the sulphuric acid is being added potassium sulphate separates out, and the liquid, at first reddish-brown, becomes clearer in color as it becomes acid. It is then concentrated somewhat, and 93 per cent. alcohol is added, with stirring, until a test filtered off remains clear with barium chloride. The filtered alcoholic solution is warmed over the water-bath with carbonate of zinc that has been rubbed up with water to a thick paste, and then filtered boiling hot. If too much alcohol had not been added previously, on cooling the filtrate solidifies to a magma of zinc lactate that is made pure by a single recrystallization. The

weight of the first crystallization amounted in one experiment to 44 per cent. of the pure grape sugar used, which would correspond to 27 per cent. of pure lactic acid.

In a second paper, Kiliani gives fuller results and still more satisfactory directions for the preparation of lactic acid. He here states that the best material for the preparation of lactic acid is invert sugar, as it gives a better yield than ordinary glucose; and that caustic soda is to be preferred strongly to caustic potash. Besides its greater cheapness he finds that the sodium sulphate formed on neutralizing takes up the greater part of the water present, combining with it as water of crystallization. The presence of sulphate in the alcoholic solution can, with proper manipulation, and without the use of too much alcohol, be reduced to a minimum. It is not advantageous to neutralize the entire alcoholic solution with zinc carbonate, as the zinc salt of another acid that is produced at the same time as the lactic acid does not crystallize and interfere with the crystallization of the zinc lactate. The procedure now recommended by Kiliani is as follows: 500 grams of cane sugar are placed, with 250 grams of water and 10 cb. cm. of the sulphuric acid to be used later, in a stoppered flask of 2 liters capacity, and heated for 3 hours to about 50°C. The solution of invert sugar so obtained is colorless, or at most faintly yellow. After cooling, there is added to it, in portions of 50 cb. cm. at a time, 400 cb. cm. of a caustic soda solution made by dissolving 1 part of caustic soda in 1 part of water. The strong alkali settles at first as a slimy mass on the bottom, and a new portion is only to be added when the mixture has become perfectly homogeneous by shaking around. The flask should also be cooled with water while the alkali is being added. The mixture, nevertheless, takes color and becomes greatly heated. Finally, the mixture is heated to 60° to 70°C., until a test heated over a boiling water-bath does not separate cuprous oxide from Fehling's solution, but gives it only a slight greenish tinge. Into the cooled mixture the calculated amount of sulphuric acid (made by mixing 3 parts of sulphuric acid with 4 of water) is then run. As soon as the acid liquid has cooled to the temperature of the room drop in a crystal of Glauber's salt, and dip the flask in cold water until a thin crystalline crust forms on the sides, which is then removed by rapid shaking about of the flask. Cooling and shaking are continued until a crust no longer forms, when the mixture is allowed to stand quiet for 12 to 24 hours. At the end of this time

the contents of the flask appear to consist of a crystalline cake, soaked with a reddish liquid. There is then added 93 per cent. alcohol, and the whole is shaken up until on further addition no precipitate separates out. The separated Glauber's salt is separated from the alcoholic solution by a vacuum filter, and can be washed with relatively very little alcohol. The half of the alcoholic solution is neutralized over the water-bath with carbonate of zinc, filtered boiling hot, and united with the other half. The crystallization begins immediately upon cooling, and is complete after 36 hours' standing. The lactate of zinc so obtained can be pressed free from mother-liquor and recrystallized once, when it is perfectly pure. The weight of this first crystallization amounts to 30 to 40 per cent. of the sugar used. The concentrated mother-liquor yields yet another portion of crystals, which are nearly pure, although slightly yellowish in color.—*Ber. Chem. Ges.*, xv, pp. 136 and 699.

Test for Natural Vegetable Gums.—C. Reichl and F. Breinl give the following test for arabin and bassorin as distinguished from dextrin or artificial gum. The former two, when heated with hydrochloric acid and orcin, give a blue flocculent mass, which with alcoholic potash yields a violet solution, fluorescing green. This reaction is shown by wood gum so easily that even fragments of wood, which contain traces only of gum, when boiled with orcin and hydrochloric acid, show the reaction quite distinctly.—*Chem. Industrie*, Feb., 1882, p. 51.

Change of Xanthine into Theobromine and Caffeine.—Xanthine has the composition $C_5H_4N_4O_2$, and differs from theobromine, $C_7H_8N_4O_2$, by having 2 carbon and 4 hydrogen atoms less. Strecker already suggested that the second base might be a dimethyl derivative of the first. This view had not, however, been hitherto substantiated by experiment. Emil Fischer has now established this fact by converting xanthine into theobromine, and this then into caffeine. He accomplished this by dissolving xanthine in caustic soda solution, and then precipitating by acetate of lead, whereby he got a white crystalline xanthine lead. This salt, dried at 130°C., was heated with 1¼ times its weight of methyl iodide in closed tubes for 12 hours to 100°C. The contents of the tube, which are nearly dry, are boiled with water, freed from remaining lead by hydrogen sulphide, and after saturation with ammonia evaporated to crystallization. There is obtained in this way a slight yellowish crystalline powder, which on analysis proved

to be theobromine. To settle all doubts, it was then converted, after the method of Strecker, into caffeine. So that theobromine and caffeine are to be considered as respectively dimethyl- and trimethyl-xanthine. The above described change of xanthine into theobromine and caffeine also points to the possibility of obtaining this base, shown to be the fundamental part of two most important articles of diet, from quite a different crude material, viz., guano.—*Ber. Chem. Ges.*, xv, p. 453.

ANALYTICAL RESEARCHES AND INVESTIGATIONS.

COLLATED BY PROF. FREDERICK B. POWER, PH.D.

New Chemical Analysis of Copaiba Balsam.—With respect to the constituents of Maracaibo copaiba balsam the statements existing in chemical literature are considerably at variance, partly in regard to the properties of the therein contained terpene, and partly in view of the crystallizable resinous acids and amorphous resins which may be obtained therefrom. An investigation of Brix, performed in the University laboratory of Barth, at Vienna, which held for its object the elucidation of these differences, confirms in most respects the statements of Strauss (1868).

The Maracaibo balsam contains accordingly a hydrocarbon of the composition $C_{20}H_{32}$, which furnishes no crystallizable compound with hydrochloric acid, and by oxidation with the chloric acid mixture yields acetic and terephtalic acid. By the treatment of the crude terpene with sodium, there results, after the distillation of the colorless oil, upon further distillation a beautiful dark-blue oil, which, in thicker layers, is scarcely transparent, but in thinner layers shows a beautiful violet color. This body is a hydrate of the oil, and corresponds to the formula $3(C_{20}H_{32})+H_2O$. Phosphoric anhydride converts it again into the original terpene. Besides the latter there exists in the Maracaibo balsam a brown hard resin, soluble in alcohol and ether, a yellowish hard resin, sparingly soluble in alcohol, more readily in ether, and melting at 85°C., an amorphous, tough, soft resin, and a crystallizable acid, although in so small an amount that its probable identity with the metacopaivic acid of Strauss could not be definitely established. The extremely small amount of the latter found by Brix in the balsam examined by him, as also the previous statements of Bergmann, Buchheim and Bernatzik, who could obtain no crystalliz-

able acids at all, renders the existence of the latter as belonging to the integral constituents of the Maracaibo balsam somewhat problematical. The product which is furnished by the German chemical manufactories as metacopaivic acid and copaivic acid, is not obtained from copaiba balsam, but from gurgun balsam, and is not identical with Werner's gurgunic acid which, according to Strauss, is the same as metacopaivic acid. Both of the products which occur in trade melt at 126 to 129°C., dissolve in ether and alcohol, even that of 80 per cent., and are precipitated from the alcoholic solution by water in the form of beautiful, long needles, with a silky lustre. Although the obtained formula agrees perfectly with that of copaivic acid, $C_{20}H_{30}O_2$, as determined by the analyses of Rose and Hess, yet its want of solubility in ammonia, as also of all acid properties, excludes its identity with the copaivic acid of older authors. The successful obtainment of an an acetyl product points to the rational formula $C_{20}H_{28},OH_2$.—*Pharm. Zeitung*, No. 16. p. 116, 1882, from *Sitzungsberichte d. Acad. d. Wiss. zu Wien*, No. 6, p. 459, 1881.

Permanent Solution of Litmus.—Various formulas have from time to time been proposed in the journals for obtaining a permanent litmus solution, which appear, however, more or less circumstantial. The author gives a method for obtaining a solution which may be preserved for months in a vessel closed with paper, or even with a cork. The litmus solution is first prepared, according to the suggestion of Mohr, "Lehrbuch der chem.-analyt. Titrirmethode" p. 73, and subsequently evaporated at a temperature of 90°C. to dryness; if the obtained residue is then dissolved in a little glycerin, a solution is obtained which remains permanent for months, and its sensibility is in no wise influenced. By its application it is only necessary to dip a glass rod into the solution, which amount suffices for tinting any required amount of liquid.—H. K. *Ibid.*, p. 117.

Detection of Mercury in Liquids.—Prof. Merget, in Bordeaux, recommends the following very simple procedure for the detection of mercury in liquids. A bright rod of copper, or a copper plate, is dipped into the liquid to be examined, and allowed to remain therein the longer, the smaller the amount of mercury. A strip of paper is previously prepared, by rubbing it with cotton, which has been impregnated with an ammoniacal solution of nitrate of silver, and subsequently allowed to dry. The copper plate is then removed from the liquid, dried by pressing it between bibulous paper, and enclosed in doubly

folded silk paper, which is then covered by the reagent paper, and kept in position by allowing a book or other object to rest upon it. The reaction is rendered evident upon the silk paper, without the direct contact of the metal, and after a few minutes a deposit of silver is formed upon the paper, and which corresponds to the length of the copper plate which has been immersed in the liquid. By means of this extremely sensitive reaction mercury may be detected in the blood of small animals which have been slowly destroyed by exposure to mercurial vapors, as also with certainty in the urine of syphilitic persons, who have been subjected to mercurial treatment.—*Ibid.*, No. 18, p. 132, 1882, from *Journ. de med. de Bordeaux*, p. 339, 1881.

Distinction between Cadaver and Plant Alkaloids. By H. Beckurts. —Since the knowledge of the fact that in dead bodies, through the influence of putrefaction, alkaloidal bodies—scepticines, or the ptomaines of Selmi, may be formed, which, in their chemical reactions, show a behavior quite analogous to that of the plant bases, the attempt has been repeatedly made to discover characteristic points of distinction between them.

General reactions, by means of which it may be readily and certainly decided whether a plant alkaloid or one of the so-called ptomaines is in question, have remained as yet unknown. The discovery of such must also remain for the present at least problematical, as long as the knowledge of the chemical nature of the ptomaines remains so deficient, and when under the latter designation an entire group of compounds is comprehended, the members of which, apparently, formed under the same conditions, exert a varying physiological action, and probably stand also in very loose chemical connection. Our interest, therefore, must be attracted the more to a recently puplished essay of Brouardel and Boutmy ("Comptes Rendus," 1881, p., 92, 1056), wherein they maintain to have found in potassium ferridcyanide a reagent which will distinguish these two classes of bodies. Plant alkaloids, according to the statements of these chemists, do not change this salt, whereas the ptomaines reduce the same at once to potassium ferrocyanide, which may be recognized by a precipitate of Prussian-blue on the addition of a ferric salt. An exception to the rule is morphine and veratrine, of which the former has a strong reducing action, the latter to a lesser extent.

The importance of this statement for forensic chemistry induced the author to repeat the related experiments, but only with regard to the

behavior of the plant alkaloids towards potassium ferricyanide, as the reducing action of the ptomaines has been emphasized by all investigators as a characteristic property, and therefore does not require a repeated confirmation by experiments.

The experiments were so conducted that for each a centigram of the alkaloid was dissolved in five cubic centimenters of water with the acid of diute sulphuric acid, then two drops of a ten per cent. solution of potassium ferricyanide added, and subsequently one drop of a very dilute neutral ferric chloride solution.

Morphine and colchicine reduced the potassium ferricyanide very strongly; the mixture, upon the addition of ferric chloride, became immediately dark-blue. A less strong, but still plainly perceptible reduction, recognizable by the formation of a greenish-blue liquid after the addition of ferric chloride, and from which immediately, or after a short time flocks of Prussian-blue were precipitated, was effected by aconitine (English and German), brucine, conine, digitaline, nicotine, strychnine, papaverine, narceine, codeine, and, in accordance with the statements of the named chemists, veratrine. To these may also be added picrotoxin (in neutral solution), while atropine produced no reduction.

If it be accepted that the ptomaines which, accordiug to a recent investigation of A. Casali ("Gazz. chim.," 1881, p. 314), are considered as amido acids, possess a stronger property of reduction than most alkaloids, it is seen from the communicated experiments that a distinguishing reaction between plant poisons and ptomaines with regard to their behavior towards potassium ferricyanide cannot be observed.

The author finally mentions that he is still occupied with the examination of the crystalline, or amorphous precipitates, which are produced by potassium ferricyanide and ferrocyanide with the alkaloids mentioned.—*Archiv der Pharm.*, Feb., 1882 pp., 104—106.

The Prsence of Ptomaines in the Inferior Animals. By M. Schlagdenhauffen.—The author reviews the history of the important discovery of this class of organic poisons by the Italian chemists Moriggia and Battistini, in 1875, which were also observed at about the same time by Selmi, Casali and Vella, and who called attention to their great importance in toxicology. More recently Brouardel and Boutmy, as also A. Gautier, have occupied themselves with the study of the formation of these bodies. According to the former, the ptomaines are the result of the putrid transformation of albuminous bodies. They

are most readily formed when the putrefaction takes place with exclusion of the air, and result from the union of certain hydrocarbons with the nitrogen proceeding from the tissues or from the animal liquids, while the oxygen of these materials and their carbon are dissipated in the form of carbonic acid gas. They may also be formed during life.

A. Gautier, whom Selmi was pleased to recognize as the first chemist to affirm the existence of ptomaines in putrefying matters, has expressed the opinion that they result from a division of the albuminoid matters. He has searched for them among the products of secretion of certain animals which are provided with special glands, and has confirmed their presence in the venom of reptiles.

Pursuing the thought of the physiological formation of these bodies, the question arose whether the salivary glands of the superior animals would not produce toxic substances, analogous to the venom of serpents, and has indeed found in normal human saliva, a very toxic substance, particularly in its action upon birds, with which it produces intense stupefaction. It consists principally of a venomous alkaloid, forming a soluble and uncrystallizable chloro-platinate and chloro-aurate, of the nature of the cadaver alkaloids.

Based upon the interesting results of Gautier, the author has sought to disclose the presence of ptomaines in the inferior animals, selecting the comestible oyster and the common mussel as the subjects for experiment.

The animal, after having been detached from the shell, was deprived of the larger part of the tissue, in order to retain simply the central organ, the stomach and liver, upon which the experiments were made. The material was rubbed in a mortar with sand, which latter had been previously washed with acid and strongly ignited, and finally the organic material, after complete desiccation in a bath of salt water, introduced into an apparatus for continual displacement, and treated with hot ether. The etherial liquid, evaporated to the consistence of an extract, contained a notable quantity of fatty matter mixed with chlorophyll, the presence of which was easily disclosed, either by the aid of the spectroscope or by means of concentrated hydrochloric acid. The etherial extract was then extracted with water, without the addition of an acid.

The aqueous solution, evaporated to a convenient quantity, presented all the characters of the cadaver alkaloids. It gave a yellowish-white precipitate with potassio-mercurie iodide and potassio-cadmic iodide.

Iodine in potassium iodide and the double iodide of bismuth and potassium, produced brown precipitates. Picric acid, phospho-molybdate of sodium, and tannin produced, likewise, abundant precipitates. Pottassium ferricyanide, in contact with ferric chloride, gave rise to the formation of Prussian-blue. Its hypodermic injection produced in the frog a stupefying effect, but without causing death.

These characters agree with those of the ptomaines; and the author concludes from the above reactions, that shell-fish contain bodies analogous to the vegetable alkaloids.

As to their origin, the author considers it difficult from the preliminary experiments to attribute their formation to a division of the albuminoid matters of the tissue, for nothing peremptorily demonstrates it; one would be able to refer them perhaps to a transformation of the alimentary bodies.

It would not be without interest to examine whether the production of ptomaines in animals is more abundant under certain physiological conditions than in others, or whether the toxic action of these bodies is more pronounced in summer than in winter. It is in order to elucidate this question that the author proposes to return again to the subject, after having investigated the reason, which is still the subject of controversy, why the consumption of oysters and mussels at certain seasons of the year is attended with danger.—*Journ. de Pharm. d'Alsace-Lorraine*, March, 1882, pp., 53—55.

The Venom of Human Saliva.—Gautier, as stated in the preceding article, has made the very interesting observation that the venom of serpents only appears to differ from human saliva, by the intensity of its effects, rather than by its nature, and it is therefore not unreasonable that particular danger is generally attributed to the bite of a man. Gautier has demonstrated his assertions as follows: 20 grams of normal saliva were evaporated in a bath of salt water; after lixiviation and successive clarification there remained in the capsule a product resembling an alkaloid, and weighing, for the amount of material indicated, 10 centigrams. A solution of this substance, injected under the skin of a bird, produced remarkably toxic effects. Almost immediately after the injection the bird was seized with trembling, staggered, and fell to the earth in a state of coma, or complete stupor, which was terminated by death in the course of half an hour, or one hour after the injected dose and following the rigor of the little animal. The phenomena resembled completely those of

the bite of a venomous serpent, and the substance consists principally of an alkaloid of the nature of the cadaver poisons or ptomaines, with which it agrees in its chemical reactions. This discovery, as Acart has remarked in a notice on the subject, may modify very much the question of virulent diseases; for that which in the one case is the result of the infiltration of bacteria may be in the other a simple substitution of chemical compounds. In any case it is certain that a virus is not here in question; for under the influence of elevated temperatures the virus is destroyed, while in submitting this salivary alkaloid to a temperature above 100°C. its toxic property was not diminished. In order to give greater weight to the facts which he has submitted, Gautier has studied the comparative action of the venom of one of the most formidable serpents of India, the *najans tripudians*, or better known as the cobra. This venom when injected in the dose of one milligram, dissolved in a quarter of a cubic centimeter of water, under the skin of a little bird, such as a chaffinch or sparrow, produced death in from five to twelve minutes. There was to be observed torpor, coma, then a period of excitement with convulsive movements and tetanic contractions. *Ibid.*, Jan., 1882, pp. 12, 22; from *La Nature.*

Preparation of Nitroglycerin.—Boutmy and Foucher have recently been awarded by the French Academy of Sciences the prize of 2,500 francs for their new and safe method of the preparation of nitroglycerin. The process consists in combining the glycerin with the sulphuric acid so as to form the glycerin-sulphuric acid, and decomposing the latter, slowly, by means of nitric acid. Two solutions are thus prepared: the glycerin-sulphuric acid and the sulpho-nitric acid, the latter being formed by the mixture of equal parts of sulphuric and nitric acids. These mixtures give rise to the emission of a large amount of heat, which necessitates the employment of refrigerating mixtures. In finally mixing these acids in convenient proportions, a reaction is produced which continues about 20 minutes. The nitroglycerin is deposited at the bottom of the vessel, and may be readily collected and washed. According to the old process, the reaction was rapidly accomplished, and a portion of the nitroglycerin arose to the surface, which rendered the operation of washing difficult.—*Ibid.*, March, 1882, p. 52.

Estimation of Ergot in Bread and Flour. By Dr. Pöhl.—The author communicates the following ready method for the quantitative

estimation of ergot in rye flour and bread: 15 grams of the flour, or well dried bread are digested with 30 cubic centimeters of ether, to which 15 drops of dilute sulphuric acid (1:5) have been added. The etherial solution is filtered, the flour washed upon the filter with ether, until 30 cubic centimeters of filtrate are obtained, and to the latter 20 cubic centimeters of a cold saturated solution of sodium bicarbonate are then added, whereby the reddish-violet coloring matter of the ergot passes into the aqueous solution, which may be removed by means of a separatory funnel. For the comparative colorimetric estimation two artificial mixtures of flour and ergot are prepared, one of 5 per cent. and the other of 1 per cent., which are then subjected to the same treatment.—*Pharm. Ztschr. für Russl.*, No. 20., p. 933.

Crystallized Hyoscyamine.—Duquesnel has succeeded in obtaining this alkaloid in a crystalline form. The pure sulphate was digested for a long time in the cold with calcium carbonate, the mixture triturated with sand, and dried over sulphuric acid. After having been powdered, the alkaloid was then extracted, by means of dry chloroform, when it crystallized upon evaporation at a very slightly elevated temperature in beautiful stellately grouped prisms. Whether hyoscyamine is identical with the other mydriatic alkaloids remains at present undecided.—*Chem. Zeitung*, No. 7., 1882, p. 124; from *Journ. Pharm. Chim.*, Febr., p. 131.

On the Decomposition of Pilocarpine.—According to Chastaing, this alkaloid is decomposed by heating with caustic potassa into carbonic acid, butyric acid, methylamine, and traces of acetic acid, according to the equation:

$$C_{11}H_{16}N_2O_2 + 5H_2O = CO_2 + 2C_4H_8O_2 + 2CH_5N + O.$$

Occasionally, and especially when the pilocarpine has been previously treated with fuming nitric acid, bases of the pyridine series are also formed.—*Ibid.*, No. 10., 1882, p. 184; from *Compt. rend.*, 94, p. 223.

Examination of Chocolate. By E. Herbst.—For the estimation of the sugar the chocolate, which has been previously deprived of fat, is extracted with boiling 50 per cent. alcohol as long as a brown-red color is imparted to the latter. The solution is evaporated to dryness, the residue taken up with water, the ensuing solution evaporated, and the residue dried at a 100°C., in a current of illuminating gas, and calculated as sugar. The mass deprived of fat and sugar is then dried

and weighed. On an average the pure cacao mass contains 50 per cent. of fat, and the amount of fat must, therefore, be nearly equal to half the weight of the chocolate, minus the amount of sugar. By the estimation of the ash, which should not amount to more than 2 per cent., mineral adulterations may be detected, while flour, chicory, acorns, etc., may be recognized, by a microscopical examination. *Ibid.*, No. 12, 1882, p., 222; from *Bad. Gew. Ztg.*, 15, p. 65.

The Detection of Tin with Arsenic. By Patterson Muir.—The precipitated sulphides of the arsenic group are warmed with hydrochloric acid, the insoluble residue tested for arsenic, and ¾ of the solution boiled with copper turnings for ten minutes. The stannic chloride is thereby converted into stannous chloride, which first reduces mercuric chloride to calomel, and soon to gray, metallic mercury. The rest of the solution may be tested in the usual way for antimony.—*Ibid.*, p. 222; from *Chem. News*, 45, p. 69.

CHIA SEED.

By Hiland Flowers, Ph.G.

Read at the Pharmaceutical Meeting, April 18th.

The Chia seed is obtained from the Salvia hispanica or Salvia Chian, a plant which grows in the northern States of Mexico, and is a species of the Sage genus.

The seed is a small one, about the one-sixteenth of an inch in length and about the one-twenty-fourth of an inch in width; it is oblong-ovate, somewhat flattish, nearly cylindrical, but both ends rounded and slightly tapering; the thinner end has a small, dark line forming a slight projection which is the eye of the seed, and this, when exposed to moisture, opens in a star-shaped or scalloped manner, emitting the growing embryo; below this eye are oil cells.

The seed is smooth and glossy, and is surrounded by a transparent epithelium, swelling very largely when in water. The testa is darkish-gray, striated with dark brown lines, running diagonally, and dotted, forming a very beautiful variegated surface; when pressed or crushed under a spatula it bursts at the hilum, exposing the cotyledons and the oil cells, leaving an oily stain upon the paper or other surface. Internally the testa is dark, grayish-brown, perfectly smooth, glossy, and devoid of the external variegations or striæ. The seed contains the

embryo with the radicle pointing towards the hilum, and a white, oily mucilaginous substance, much resembling unrendered fat.

The seed swells to about twice its natural size in water and yields to it very readily and largely its mucilaginous properties forming a thick solution. When treated with hot alcohol a solution is obtained which becomes cloudy on cooling and forms white scales with globules of oil on the side of the vessel and a clear pale-yellowish bland oil at the bottom; with ether the same substances are obtained with more of the white sediment; this, when treated with solution of mercury and nitric acid, acquires a reddish-brown tinge. The mucilage is coagulated by solution of more chloride; and when the seeds are immersed in a weak solution of iron they refuse to yield their mucilaginous substance and become at once surrounded with a congealed mass; the mucilage, when treated with tincture of iodine, gives no characteristic blue color. The whitish sediment obtained from the ether solution, when mixed with potassa solution, and heated, becomes flocculent. The pale-yellowish bland oil from the hot alcohol and other solutions has a taste much resembling nut oil containing a trace of flaxseed oil; and when secured by expression is of a much darker color, though somewhat lighter than the linseed oil, which it greatly resembles, both in odor and taste; when the oil is boiled long it becomes of a deep dark-brown color and more marked in its similarity to that of linseed thus treated. From my experiments it seems probable that this oil would equal that of the flax if not surpass it. Some of the oil left in a capsule for several days dried well, leaving a thin coating as is noticed in other oils of like nature.

The seeds are inodorous when whole, when crushed of an oily odor, and of a mucilaginous oily taste very much like ground flaxseed. The seeds are used, to quote from correspondence, to a large extent by the natives and foreigners for the preparation of a refreshing drink for the sick. This is prepared by adding a tablespoonful of the seed to a tumblerful of cold water, and after half an hour it is ready; generally it is sweetened and flavored with orange-flower water. This mild and cooling beverage will be found very efficient in fevers when great thirst usually troubles the invalid. Its demulcent properties are well known and highly valued by those who have used it; and the practitioner will find the Chia seed a mild auxiliary and valuable emollient. I regard it as superior to flaxseed and as producing much better satisfaction.

When a mild injection is required, and in the earlier stages of venerial diseases, it is often advantageous, and proves of invaluable service in forming a vehicle. The mucilage will also be found of great benefit in throat affections as a gargle or wash, as it will tend to protect the inflamed parts from the miasmatic influence of the air when respiring, and it has been and is now used in ophthalmia. The properties and virtues of this seed, I believe, are worthy of investigation.

The mucilage should not be allowed to stand in open vessels longer than five or six days, as a thick whitish mould-like collection forms on top, and in preparing the drinks it will be found much preferable to renew each day.

The present cost of Chia seed to the consumer is about 60 cents per pound, but this can, I think, be lessened by cultivating the plant. At present I have some growing, and find it readily germinates in this climate; whether it will bear the northern climate remains for experiment.

New Orleans, La.

ON CHIA AND ALLIED SPECIES OF SALVIA.

By John M. Maisch.

Read at the Pharmaceutical Meeting, April 18th.

About seven or eight years ago the writer received a sample of so-called Chia seed, but was unable to learn that it was employed in the United States; recently, however, information has been received that it is used to a certain extent in the south-western States, and near the Pacific coast, and that it bids fair to attract attention in other parts. In addition to the information contained in the preceding paper by Mr. H. Flowers, the following referring to the history of this drug will prove of interest:

Guibourt, in "Histoire naturelle des drogues simples" (4 edit. II. 432), speaks of it as follows:

"The homœopathic physicians, doubtless with the view of having a particular medication, the elements of which are unknown or rarely met with, have often procured from distant countries substances, like which similar ones could have easily been found under their hands. Such is chia seed which is brought from Mexico, where it is produced by a species of sage (Salvia hispanica?). These seeds are smaller than

psyllium seeds, which they much resemble; under the magnifying glass they still more resemble very small ricinus seeds in shape as well as in their glossy and gray, mottled with brown, coat, and by which resemblance they are easily recognized. When immersed in water, they are quickly surrounded, the same as psyllium seeds, by a mucilaginous layer, similar to gum tragacanth, which, with the aid of heat, is divided or dissolved in water, forming a very soothing drink, which is neither insipid nor of a disagreeable taste, and is therefore well adapted, without any other addition, to be habitually used as a beverage for the sick. I believe that the seeds of quince and of psyllium could be employed in the same manner. Chia seeds sown at the école de pharmamie produced plants having a quadrangular stem, 35 centimeters high and nearly smooth in all its parts; the leaves are opposite and regularly 5 centimeters apart; the petioles are slender, 4 to 6 centimeters long; the leaves are rather thin, oval-lanceolate, regularly toothed, the largest being 10 centimeters long and 6 centimeters broad. In the axil of each leaf a small slender branch was produced, which did not develop, the plant perishing before producing flowers. The figure given by Gærtner of the small fruit of Salvia hispancia agrees completely with chia seed; but Gærtner places this species among those having no mucilaginous fruit, and cites as having mucilaginous fruits Salvia verbenaca, disermas, argentea, ceratophylla, æthiopis, urticifolia, canariensis, etc."

In nearly all other works on materia medica chia is not mentioned, or if enumerated it is doubtfully referred to Salvia hispanica; but Wiggers, as well as Dorvault, gives this species positively as the origin. However, aside from the statement of Gærtner as to the non-mucilaginous properties of its fruit, its stem and leaves do not correspond with the description given above by Guibourt. Thus DeCandolle in Prodromus, vol. xii, page 308, enumerates the following characters:

Salvia hispanica, *Lin.* Stem herbaceous, erect, pubescent; leaves petiolate, ovate, acute, crenately serrate, narrowed or cuneate at the base, glabrous, etc. An annual herb, 1 to 2 feet high; stem thickish; petioles and nerves of the leaves whitish pubescent; leaves long petiolate, the limb 2 to 3 inches long, etc.

Kunth, in Synopsis plantarum, etc., collegerunt Humboldt et Bonpland, vol. ii, p. 70, gives a similar description, but states the stem to

be retrorsely pubescent and the leaves to be acuminate, with an acute base and pubescent.

In 1866 Guibourt published "Observations sur les productions du Mexique" ("Jour. Phar. Chim." August, p. 95 to 108), of which an abstract appeared in this Journal (1866, p. 497 to 503). In this paper *chia* is referred to Salvia hispanica and reference is made to an Essay on Mexican Materia Medica, printed at Puebla in 1832, in which a few lines are devoted to these mucilaginous seeds. Guibourt further states: "The seeds have been planted at the école de pharmacie, and the plant has grown to a height of 35 centimeters, but it has not flowered and there is still doubt about its specific characters; it would be interesting to collect the entire plant in its native country." The author also states that by pressure an oil is obtained which is used like linseed oil; but since it is rare and sold at a rather high price there is scarcely anything else used under the name of *aceite de chia* except linseed oil.

I have not found any later observations on this plant grown in Paris, and the above quotation propably refers to the experiment related in the "Histoire." This plant cannot be identical with Salvia hispanica, which is an annual and grows wild not only in Spain, but in other parts of Southern Europe, as well as in Jamaica, Mexico and tropical America. This belief is strengthened by the Farmacopea Mexicana, which quotes the plant as a new species and gives the following information:

"Chia. *Salvia Chian*, LaLlave. Chiantzotzolli, Mex.—Grows in the central table land of Mexico and is cultivated in various parts of the republic. The seeds contain, according to Sr. Oliva, starch, a drying oil and mucilage of the nature of gum tragacanth. Immersed in water they augment considerably in volume, and in this state, with the addition of sugar and lemon juice, furnish a refreshing drink; they are also used in cataplasms as an emollient. A seed placed under the eyelid is used by the people for the purpose of removing foreign bodies from the eye."

A similar use for the eye is popularly made of various more or less mucilaginous smooth seeds, for instance flaxseed, and the seed-like akenes of a number of species of Salvia are employed in the same manner. Redwood's Supplement to the Pharmacopœia states of *Salvia verticillata*, Willd., which is indigenous to Central Europe, that "the seeds put into the eye become mucilaginous and thus facilitate the extraction of anything that has got into it." In addition to this species,

Salvia verbenaca, Lin., *S. Horminum*, Lin., *S. viridis*, Lin., and perhaps other species of Southern Europe are mentioned in older works as being employed in like manner and the small fruit of which, or at least that of S. verbenaca, was formerly called *oculus Christi*.

The peculiar arrangement of the female reproductive organs of the Labiatæ renders it difficult to distinguish their fruit from a seed. Labiate plants have four distinct or, at the base, slightly united ovaries, which are situated upon a small disk, and from the centre of which, at the base, arise the styles, united into one column, which forks at its apex into the bifid stigma. The place of attachment to the disk is so contiguous to that of the style, and confluent with the latter, that in the ripe fruit there is apparently only one scar observable, the same as in seeds, and hence these plants have by former botanists, even by Linnæus, been mistaken for gymnospermous or naked-seeded. Chia is, therefore, a fruit, an akene or nutlet; it is 2 millimeters ($\frac{1}{12}$ inch) long and 1·2 millimeter ($\frac{1}{20}$ inch) broad; the gray, marbled with brown, epicarp is covered with a transparent epithelium, which in water expands into a tender tissue, composed of delicate elongated cells.

The mucilage contained in this tissue is probably identical with that of S. hispanica and S. verticillata, which was examined in 1844 by C. Schmidt ("Ann. Chem. Phar." li. 42), and found to be a carbohydrate, which may be converted into sugar. The medical properties of chia depend upon this mucilage, and are probably identical with those of the fruits of all salvias, from which water extracts no other constituent besides the one mentioned. *Salvia urticifolia*, Lin., of the Southern United States may probably deserve as much attention for this purpose as any of the other species; it grows in dry localities and hilly woods from Southern Maryland to the upper districts of Georgia, and westward to Alabama and Arkansas. Over 400 species of salvia being known, mostly indigenous to the warm temperate zone, and to subtropical and tropical countries, it is not unlikely that many of these will prove to be more or less perfect substitutes for those that for various causes have become better known in the past.

In a paper by Dr. Edward Palmer, on the plants used by the Indians of the United States (see "Amer. Jour. Phar.," 1878, p. 539 and 586), it is stated (*l. c.* 547) that *Salvia columbariæ* is the "chia of the Mexicans and Indians of Arizona and New Mexico," and in the Botany of California (vol. i. p. 599) Prof. Asa Gray states that "this is the chia of the aborigines." To the same species refers the following interesting

account by Dr. J. T. Rothrock, which is copied from "Report upon United States Geographical Surveys west of the one hundredth Meridian," vol. vi, p. 48:

"During the summer of 1875 my attention was called, while in Southern California, to a mealy preparation in popular use among the Indians, Mexicans and prospectors. On inquiry, I found it was called 'chia.' Further examination proved that it was furnished by the seeds of *Salvia Columbariæ*, Benth. The seeds are collected, roasted and ground, in the native way, between two stones. This puts it in the condition in which I first saw it. It is used as a food by mixing it with water and enough sugar to suit the taste. It soon develops into a copious mucilaginous mass, several times the original bulk. The taste is somewhat suggestive of linseed meal. One soon acquires a fondness for it and eats it rather in the way of a luxury than with any reference to the fact that it is exceedingly nutritious besides. It is in great demand among the knowing ones who have a desert to cross, or who expect to encounter a scarcity of water, and what there is, of bad quality. By preparing it so thin that it can be used as a drink, it seems to assuage thirst, to improve the taste of water, and, in addition, to lessen the quantity of water taken, which in hot countries is often so excessive as to produce serious illness. As a remedy it is invaluable from its demulcent properties, in cases of gastro-intestinal disorders. It also holds a place among domestic remedies, for the same purpose that flax-seed occasionally does with us, *i. e.*, a grain of the seed is placed in the eye (where it gives no pain) to form a mucilage by means of which a foreign body may be removed from the organ. I have found it of great service as a poultice. As a matter of archæological interest, it may be noted that quantities of this seed were found buried in the graves several hundred years old. This proves that the use of the seed reaches back into the remote past. Indeed, I find several allusions to the name Chia in the second volume of Bancroft's great work on the "Native Races of the Pacific States," pp. 232, 280, 347 and 360. *Chianpinoli* appears to have been made by the so-called Aztec races from corn which was roasted and ground as the Chia was. Chia was, among the Nahua races of ancient Mexico, as regularly cultivated as corn, and often used in connection with it. Indeed, it was one of the many kinds of meal in constant use and which appear to have gone then, as now, under the generic name of pinoli."

It seems to me impossible that this species should be identical with

Guibourt's plant, as will be seen from its description by Asa Gray, which is taken from the "Botany of California," vol i, p. 599:

Salvia Columbariæ, Benth. Minutely tomentose or soft pubescent; stem commonly slender, branching, and leafy below, a span to a foot or two high from an annual root, naked and peduncle-like below, terminated by a solitary or two proliferous head-like false whorls; leaves deeply once or twice pinnatifid or parted into oblong and crenately toothed or incised divisions, pointless, rugose, etc.

The species is indigenous to California, more particularly the southern part thereof, where it is common, likewise in Western Arizona, while in Nevada it appears to be confined to the Truckee Pass at an altitude of 4,000 feet ("Botany of the Geological Survey of the Fortieth Parallel," by Sereno Watson). I have found no account of its occurrence throughout Mexico.

Descriptions of fruits are rarely given in systematic botanical works, an omission which is frequently embarrassing to the student of materia medica. Most of the fruits of the Labiatæ do not differ very greatly in size and shape, and more or less similarity must be expected among those of the numerous species of Salvia; how many of these may agree in the color of their epicarp and in the presence of the mucilaginous epithelium it is impossible at the present time to say. But from what has been stated above, I think it must be concluded that at least several species have fruits resembling in appearance very small ricinus seeds, and that most likely such of them which are mucilaginous have been used by the aborigines under the name of *chia*, which would, therefore, have to be regarded as a generic term, applicable to all fruits of salvias, having the characters indicated.

FALSE BELLADONNA ROOT.

By E. M. Holmes, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

In a previous paper attention was directed to the fact that the root of *Scopolio Japonica* was being imported from Japan under the name of belladonna root ("Pharm. Journ." [3], x., p. 789), and subsequently, at an Evening Meeting of the Pharmaceutical Society ("Pharm. Journ." [3], xii., p. 490), a specimen of another substitute for belladonna root, differing entirely from the Japanese drug, was exhibited. A few weeks ago some specimens of both these roots were sent to me

for identification from a provincial town. It appears desirable, therefore, as the false belladonna roots are to all appearance likely to be distributed through the country, to publish a figure of the false root and to give an account of the means by which it may easily be distinguished from the true belladonna root.

The root here alluded to has been identified by Professor Flückiger as that of *Medicago sativa*, and is stated by him to be sometimes met with on the continent as an adulterant of belladonna root.

In size and color the medicago root closely resembles that of belladonna, but differs in the following particulars:

The crown of the root is divided into 3 or 4 woody branches which are solid. The tap-root is hard and woody and broken only with difficulty. The outer surface is more or less covered with small scattered warts, and when scratched with the nail does not leave a white mark. The transverse section presents a woody structure and when it is wetted the cortical portion is seen to be of a white color with a yellowish meditullium traversed by a number of white medullary rays (Fig. *a*). When the transverse surface of the root is moistened a leguminous odor, somewhat resembling that of the pea, becomes perceptible, and the flavor is similar. The taste of the root is at first sweet like that of liquorice and afterwards bitter and somewhat acrid, irritating the fauces.

Root of *Medicago sativa*.—*a*, transverse section of root. *b*, transverse section of belladonna root.

Belladonna root is generally crowned with the *hollow* bases of the leafy stems, and the epidermis is easily scratched off by the nail, leaving a white starchy spot wherever abraded. The transverse surface of the root exhibits a narrow cortical portion of a yellowish or pale brown color, divided by a dark line from the large meditullium or central portion. The latter is also of a pale brown color, and shows, irregularly scattered through its substance, but more numerous towards the cor-

tical portion, a number of darker dots (Fig. *b*), which when examined through a lens are seen to be vascular bundles in which the openings of the large porous vessels are visible, the vessels being surrounded by a few wood cells which give the dark color to the dots. The taste of the root is starchy and slightly bitter, without subsequent acridity. The root breaks with ease. Both the medicago and the belladonna contain starch, the grains being much larger and more muller-shaped in belladonna, and forming sometimes duplex or triple granules; other granules appear circular or oblong oval, according to their position. In medicago the starch grains are somewhat similar, but smaller. There are also present in the latter root a number of linear-oval grains, presenting a well marked linear hilum. There is much less starch in the root than in belladonna, and the iodine test therefore gives a comparatively faint reaction. Neither root appears to contain tannin. The best marks by which to distinguish the medicago root therefore are the radiated structure of the meditullium, its woody character, and consequent resistance when an attempt is made to fracture it.

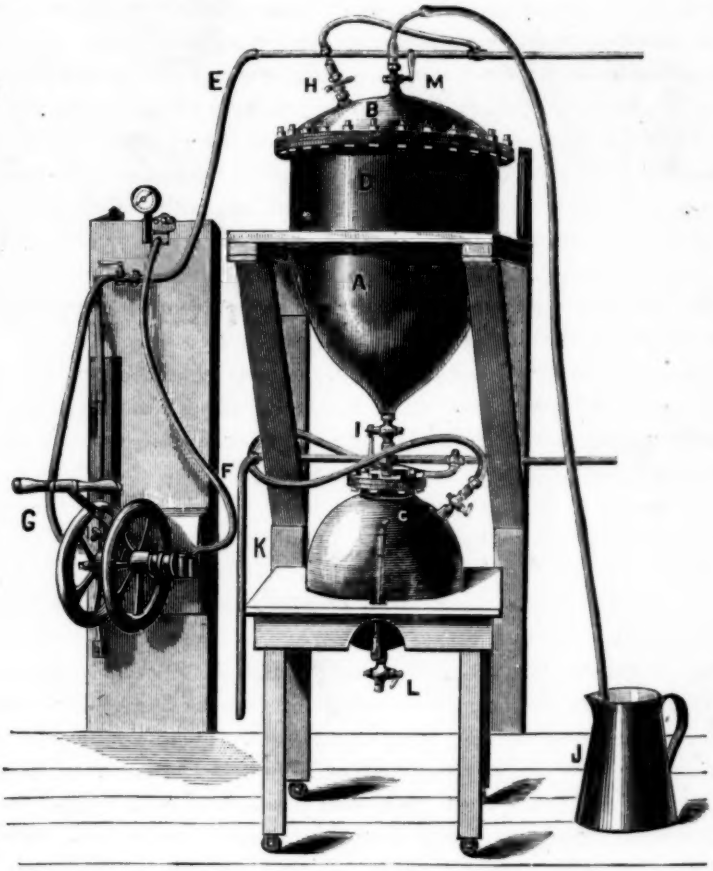
It may be added that the root was of German origin, and that those who wish for genuine root would do wisely to order the English grown drug, which is collected and prepared with more care.—*Farm. Jour. and Trans.*, March 11, 1882.

A NEW DISPLACEMENT APPARATUS.

By R. F. Fairthorne, Ph.G.

A somewhat novel and in some respects apparently very useful percolator has been brought to my notice, together with the manner in which it is employed, and some articles produced by using the same, that possess properties showing that they were well made; in fact, some of the fluid extracts were not only fair, but unusually good, and for this reason I thought that a description of the percolator and of the manner in which it is used might be as acceptable to others as it was to me. By referring to the annexed cut the use of each part will easily be understood. The shape of the percolator differs somewhat from the usual form, being to some extent egg-shaped, and articles packed in it are not so liable to become so compressed as to impede percolation, as is sometimes the case when the ordinary form of displacer is used which more nearly approaches the cylindrical form. The cover *B*, which is hemispherical in shape, is fastened unto the body *A*

of the displacement apparatus, by means of clamps with India rubber rings between to render it air tight. The drug to be operated on having been previously sufficiently moistened with the menstruum and packed is next exhausted of as much air as possible by a vacuum being produced through the upper part of the vessel, by means of an air



Percolator, with air pump.

pump *G*, which is connected with it by means of the tube *F*. The stop-cock *h* is next closed and *M* opened, connecting with the tube *E*, the end of which dips into the liquid to be employed as menstruum, and thereby a sufficient quantity of it is allowed to be drawn into the

displacer to cover the drug. The stop-cock *M* is then closed and the materials allowed to macerate for several days.

In order to start percolation, the receiver *C* is exhausted of air and the tap *i* having been opened the saturated fluid will begin dropping, and continue to do so, so long as the force of the vacuum in the receiver is equal or greater to that in the upper vessel. When it begins to stop, air is admitted above the drug which is drawn through the material, carrying with it much of the remaining liquid. To finish the operation air is forced into the percolator by means of the pump. Messrs. Smith, Kline & Co., of this city, who have adopted this apparatus for making fluid extracts, state that they find it works very satisfactorily and economically as so large a proportion of the menstruum used is recovered. As an instance in making fluid extract of Wild Cherry, when 80 pounds of the bark are used 80 pints only of liquid are employed and at least 75 pints are recovered.

From what is here stated it will be apparent that the superiority of this mode of extraction of those active ingredients, that the fluid extracts and tinctures should contain, depends chiefly upon two conditions to which the drug operated upon is subjected, namely, upon the effect produced by withdrawing the ordinary pressure of the atmosphere, not only on the surface of the material, but on each particle of the substance; a vacuum being thereby produced in each individual cell which is at once filled up upon contact with the liquid when it is admitted into the vessel, the menstruum under these conditions being enabled to penetrate much more quickly and readily the interior of each granule of the article operated upon.

The advantage of the other condition consists of exclusion of air, by means of the cover and retention of vapor of the fluids used in making the preparations, preventing thereby changes which might otherwise occur, both in the liquid and solid contents of the percolator.

As only such drugs are used that have been well dried, we can understand readily the difficulty with which many of them are exhausted by the usual process, when we take into consideration that each particle of the drug is composed of cells which, by desiccation, become partially empty, offering a certain amount of resistance to the entrance of liquids in somewhat the same manner that a piece of pumice-stone or pith of sassafras resist the penetration of water when thrown into it. Therefore, if a vacuum can be formed in these cells, fluids will much more readily surround and penetrate them.

In using this apparatus for preparing fluid extracts only one pint of menstruum for every sixteen ounces of the material is employed, and after the liquid has ceased to run into the receiver, more menstruum is added, just sufficient to produce a pint of the finished product. No evaporation of any portion of the tincture is required as in the officinal process.

By means of suitable iron pipes any number of percolators and receivers may be connected with a stationary air-pump, and after closing the stop-cocks of the others the air in any one vessel may be rarefied or compressed at pleasure.

SYRUP OF HYDRIODIC ACID.

By W. Gilmour.

An American preparation of hydriodic acid in the form of a syrup has lately been brought under the notice of medical men and pharmacists in this country, with the recommendation that the acid "is perfectly protected against decomposition—a result never before attained." Into the composition of this particular syrup, or its preservative medium, I will not at present enter, but I wish to point out that the statement here made, as also that in the recommendatory advertisement, that "simple mixtures of hydriodic acid and syrup do not keep," are only partially correct.

Nearly thirty years ago, when this preparation was first introduced, Mr. Murdoch, of Glasgow, showed that a syrup of this acid could be kept with ordinary care for an indefinite period. This is my own experience also. With attention to the conditions afterwards to be referred to, there is less trouble from decomposition with a syrup of this acid than there is with a syrup of any of the ordinary ferrous preparations.

It will probably be remembered by many that Dr. Buchanan, who was the first to bring this acid prominently under medical notice as a therapeutic agent, recommended that it should be prepared extemporaneously by double decomposition of concentrated solutions of iodide of potassium and tartaric acid. When prepared in this way the resulting liquid is of a bright yellow color, deepening quickly into a darker red, and giving abundant indications of the presence of free iodine within a very short time of its preparation. Mr. Murdoch attributed

this rapid decomposition to contact with the air from the agitation necessary to effect separation of the bitartrate precipitate. It probably, however, admits of another explanation. Should any one take the trouble to investigate the reaction between the two foregoing substances, they will find that the bitartrate precipitate is formed only to the extent of about one-half of the theoretical quantity, and further, that this is not entirely due to the solvent power of the hydriodic acid on the bitartrate precipitate, but is due also to the fact that there is not complete decomposition between the iodide of potassium and tartaric acid. In short, the phenomenon here is very similar to that quite recently pointed out as taking place in the preparation of Fothergill's hydrobromic acid. The resulting product is consequently neither uniform nor stable in its nature, so that a syrup prepared from it can scarcely be depended upon for uniformity of strength or keeping properties. Along with this there was probably one other circumstance that militated against the keeping properties of the earlier preparations, viz., their strength. If I remember rightly, the strength of the solution as proposed by Dr. Buchanan was as near as possible an equivalent of 5 grains iodine to each fluiddrachm, while the syrup as proposed by Mr. Murdoch contained 2 grains iodine in the same quantity. Now it may be pointed out that the keeping properties of the syrup depend to a great extent upon these two things, namely, the acid strength of the syrup and the density of the syrup. Two ounces, for example, of an aqueous solution of the acid, containing an equivalent of 5 grains iodine to each drachm, was exposed in a capsule, and began to decompose in one or two hours' time; in 12 hours the presence of free iodine was quite visible, and in three or four days the whole of the iodine was set free. On the other hand, the same quantity of a syrup of similar strength, and of density 1·320, was exposed under the same conditions, and in three or four days it had only assumed a slightly deeper straw-colored shade. At the end of this time it had thickened considerably, owing to evaporation, and it ultimately got into a kind of pasty mass in which condition, so far as my experiments have gone, it is practically stable. A syrup of density 1·180 (about half the sugar strength of the foregoing) will slowly decompose after a few days' exposure, but the rate at which decomposition takes place will depend upon the acid strength, a stronger preparation decomposing much more quickly than a weaker. I have prepared and exposed syrups of various strengths and densities, and

all the experiments tend towards the same conclusion, so that there is reason in the weaker strength of the syrup now being advertised. Glycerin, it may be stated, has little restraining effect on the decomposition, probably owing to its hygroscopic properties.

As to the best manner of preparing the acid, I have tried nearly all the methods, and in the end have always come back to the decomposition of sulphuretted hydrogen with free iodine as represented by the following equation: $2H_2S+2I_2=S_2+4HI$. Decomposition of iodide of barium with sulphuric acid might afford a suitable means of obtaining it, were it not for these two objections, namely, that it necessitates the personal preparation of the iodide of barium, and, second, the distillation of the product after decomposition. The methods recommended in text-books of decomposing iodide of potassium with iodine and phosphorus in the presence of a small quantity of water, or of distilling the acid from iodine and phosphorus in the presence of a large quantity of water, are both unsatisfactory. In the first case there is always more or less of an element of risk, and, moreover, the strength of the finished product requires in every case to be estimated; while the second method has always proved in my hands an admirable one for obtaining a variety of compounds of which phosphoretted hydrogen may be taken as typical. In preparing a stronger solution, say of four or five grains iodine to each drachm, by the sulphuretted hydrogen process some little difficulty may at first be experienced in effecting complete decomposition of the iodine. The iodine is not soluble to any extent in water, nor can it conveniently be kept suspended in the water so as to allow the sulphuretted hydrogen to act upon it. If put, therefore, into the bottle through which the sulphuretted hydrogen gas is being passed, it simply lies at the bottom, the particles shortly adhere and form a plastic mass; this in turn soon becomes coated with sulphur, and practically the iodine ceases to dissolve. To obviate this I take advantage of the solubility of iodine in both hydriodic acid and sulphuretted hydrogen, and instead of passing the gas *on to the iodine* I pass it *through the iodine solution*. To do this without waste, two bottles are required, the one being attached to the gas generator and the other preparing for it. The iodine (in a glass mortar) is rubbed down with the solution from the sulphuretted hydrogen generator until it is saturated, when it is again transferred to the generator and the other withdrawn from it, in turn to be saturated with the iodine. In this way the process can be carried on with the least waste either of time or material.—*The Chemist and Druggist*, February 15, 1882.

PRACTICAL NOTES FROM VARIOUS SOURCES.

By the Editor.

Purification of Naphthalin—Crude naphthalin is fused, well mixed with sulphuric acid (such of 60° is sufficiently strong), and afterwards with 5 per cent. of finely-powdered black oxide of marganese gradually added. After 15 or 20 minutes the mixture is cooled, the naphthalin is repeatedly melted with water and with weak soda solution, and finally distilled. Other oxydizing agents may be used in place of manganese. Thus purified, naphthalin remains perfectly white.—*Rep. Anal. Chem.*, 1881, No. 21; *Phar. Centralh.*, 1882, No. 3.

The Origin of Benzoic Acid is best determined, according to O. Schlickum, by the peculiar empyreumatic odor. Pure benzoic acid does not reduce potassium permanganate; if a reduction takes place it is usually due to cinnamic acid. The reaction is best performed with the free acid or in the form of sodium salt, but not with a boiling alkaline liquid which is apt to cause a reduction from various causes. If 0·10 gram of benzoic acid or its sodium salt is agitated with 5 grams of water and after the addition of 10 or 15 drops of one-tenth per cent. solution of potassium permanganate the color of the latter is discharged, the benzoic acid has most likely been prepared from Siam benzoin. If a red tinge is permanently produced by 3 or 4 drops of chameleon solution, the acid was probably artificially prepared from toluol; if such an acid be resublimed in the presence of a small quantity of benzoin, the product behaves nearly the same as the acid obtained from Siam benzoin. The mixed silver salts of cinnamic and benzoic acid may be separated by boiling water, in which the silver cinnamate is insoluble.—*Phar. Zeitung*, 1882, p. 24. See also *Am. Jour. Phar.*, 1882, p. 56.

Preservation of Ergot.—Emil Perret directs the ergot to be bruised, and dried at 40°C., then powdered and dried at 80°C., then in a percolator exhausted with strong ether, after which the powder is dried at 35°C. for several hours, the heat being afterwards raised to 40, to 60, to 80 and for a few moments to 100°C. (See also "Amer. Journ. Pharm." 1881, p. 457.) The powder kept in vials, retains a little ether, which after six months, is given off on heating to 110 or 115°C.—*Bull. gén. de Thér.*, March, 1882, p. 202 to 204.

Stanislas Martin (*Ibid.*, p. 245) directs attention to the fact that as

early as 1839, it had been recommended to wash ergot with alcohol previous to pulverizing it, but that the proposition had been opposed by Soubeiran, and that last year Baudrimont opposed the official recognition of powdered ergot by the new Codex. Insects are not the sole cause of the deterioration of ergot, and it still remains to be proven whether ergot which has been kept for a long time in the state of powder has preserved its medicinal properties unimpaired.

Simple Syrup, if prepared from refined sugar with distilled water or with water free from lime, according to Lacombe, does not need clarification with albumen to become clear; while on the other hand ordinary water, containing lime yields a turbid syrup, requiring clarification.—*L'Union Phar.*

Vinum Condurango.—Dr. Albert Hoffmann of the Medical Clinic of Basel again calls attention to condurango of Ecuador as a useful remedy in cancer. Of 20 cases treated with it improvement was noticed in 40 per cent., uncured 10 per cent., and died 50 per cent. The most advantageous form of administration was the wine, prepared as follows: $2\frac{1}{2}$ kilos of coarsely powdered condurango bark are macerated for 2 days in 10 liters of cold water and the infusion strained; the residue is again mixed with 10 liters of cold water, boiled for an hour, allowed to cool and again strained; the residue is treated for two days with 5 liters of alcohol, expressed, the alcohol distilled off, the residuary liquid mixed with the aqueous liquids and the whole evaporated to the consistence of an extract which is to be dissolved in $2\frac{1}{2}$ liters of Malaga wine, decanted from the sediment and filtered. This preparation has an agreeable bitter taste and is readily taken by the patients. Prepared with condurango from Venezuela it has, however, an acrid peppery taste and is either not taken by the patients or does not agree with them.—*Schweiz. Woch. f. Phar.*, 1882, No. 4.

Wash for Fissures from Frostbites.—Borax 4 grams, rose-water 200 grams, glycerin 50 grams, tincture of tolu 10 grams; mix.—*La Presse Méd.*, Feb., 1882, p. 30.

Disinfecting Liquid, Fonssagrives'.—Dissolve ferric sulphate 500 gm., and phenol 1 gm., in 10 liters of water. *Revue de Thérap.*, March, 1882, p. 163.

Carbolic tablettes are prepared by G. Schweitzer by intimately mixing 20 parts of powdered talc with 50 parts of plaster Paris and 10 parts of carbolic acid; sufficient water is then added to form a mass which is poured into small paper capsules prepared for the pur-

pose. The mass soon becomes hard; each tablette is then wrapped in paper and tinfoil and the whole preserved in a tin box. For use, the wrapper is removed and the tablette placed in a suitable place in a room, in which a pretty strong odor of phenol will be perceptible for 10 or 15 days, according to the temperature.—*Jour. Phar. d' Als.-Lorr.*, March, 1882, p. 56.

Collyrium of the Benedictines.—Hager publishes the following formula: Powdered soot 100 gm. is digested for several hours with water, 250 gm. Filter, evaporate to dryness and dissolve in acetic acid of 1·040 sp. gr., and distilled water each 100 gm.; alcohol, 50 gm.; add extract of hundred-leaved rose petals, 10 gm., previously dissolved in rose-water, 50 gm; macerate for a day and filter.

This collyrium is much employed in France, particularly in the southwestern part thereof, and is said to be particularly useful in scrofulous affections. For use, 20 or 30 drops of it are added to a wineglassful of lukewarm water and this is applied to the eyes by means of linen.

Another formula directs 200 gm. of good wine to be used in place of the distilled water, rose-water and alcohol.—*Phar. Centralhalle*, 1882; No. 10, p. 112.

The formula given by Dorvault directs extracting 60 gm. of soot, with boiling water, filtering, evaporating to dryness, dissolving in a sufficient quantity of strong vinegar, and adding for every 75 gm. of this liquid 1·2 gm. of extract of rose-petals.

Cosmetic Wash, Startin's.—Dissolve borax, 10 gm., in orangeflower-water 1 liter, and add glycerin 50 gm.—*Revue de Thérap.*, March, 1882, p. 165.

OPIUM ASSAY.

Flückiger's Process Modified by E. R. Squibb.

Take of opium in its commercial condition 10 grams = 154·32 grains.

If commercial powdered opium is to be assayed for morphia it should not be dried, but should be weighed for the assay in the condition in which it is found in the market, and in which it is to be dispensed.

If commercial moist opium is to be assayed for morphia, the taking of the sample for assay is a matter of great importance, because it is highly probable that, unless by accident, no two lumps of a case are of exactly the same morphia strength. Hence it is that assays of moist

opium are at best only close approximations, though sufficient for practical purposes.

About every tenth lump of a case should be sampled by cutting out a cone-shaped piece from the middle of the lump, with an ordinary pocket knife. Then from the side of each cone a small strip is taken from point to base, not exceeding say half a gram from cones which would average 10 to 15 grams, and the cone is then returned to its place in the lump. The little strips are then worked into a homogeneous mass by the fingers, and the mass is then wrapped in tin-foil, moist cloth or paper, to prevent drying, until it can be weighed off for assay. When opened to be weighed off, it is best to weigh at once three portions of ten grams each. In one portion the moisture is determined by drying it on a tared capsule until it ceases to loose weight at 100°C. = 212° F. Another portion is used for immediate assay, and the third is reserved for a check assay if desirable.

Put the weighed portion into a flask or common wide-mouthed vial of 120 cc. = 4 fluidounces capacity, tared and fitted with a good cork. Add 100 cc. = 3·3 fluidounces of water,—distilled water by preference, but this is essential only when common water contains an unusual amount of inorganic matter—and shake well. Allow it to macerate over night, or for about 12 hours, with occasional shaking, and then shake well and transfer the magma to a filter of about 10 centimeters = 4 inches diameter, which has been placed in a funnel and well wetted. As it is the shaking which accomplishes the object here in view, rather than the standing, the time of maceration can be easily shortened even to three hours, if the shaking be frequent and active.

As rare exceptions, some powdered opiums will be found which through natural conditions give a magma with water which will not filter, or filter so very slowly that the water solvent becomes impracticable. When this is discovered, the magma is thrown away and a fresh portion of powder is taken. Wash this by agitation in the bottle with 30 cc. = 1 fluidounce of ether (s. g. ·728), transfer it to a filter, rinse the bottle with 20 cc. = ·66 fluidounce more ether, and pour this into the opium in the filter. When this has passed through, wash the filter and opium with 10 cc. = ·33 fluidounce more ether applied drop by drop around the edges of the filter and on the surface of the opium. Then dry the powder on the filter and use it as in the case of opium which does not need to be first washed with ether.

Opium which is adulterated, or standardized by admixture with dextrin, gums, sugar or glucosides, yields an impracticable magma with water, and ether washing to such does little or no good. All such samples have to be exhausted with an alcoholic solvent. If not much adulterated a mixture of equal measures of alcohol (s. g. ·820) and water will answer best, but generally a mixture of two measures of

alcohol (s. g. ·820) with one measure of water is to be used instead of water alone, for the exhaustion, and as this mixture is not as good a solvent for the morphia salts in the opium as water, more of it is required, and the washing and percolating should be carried to 250 cc. = 8·33 fluidounces of solution from the 10 grams = 154·32 grains of opium. The process after exhaustion is the same as where water is used as the solvent.

Filter off the solution into a tared or marked vessel and percolate the residue on the filter with water dropped onto the edges of the filter and the residue until the filtrate measures about 120 cc = 4 fluidounces, and set this strong solution aside. Then return the residue to the bottle by means of a very small spatula, without breaking or disturbing the filter in the funnel, add 30 cc. = 1 fluidounce of water, shake well and return the magma to the filter. When drained rinse the bottle twice, each time with 10 cc. = ·33 fluidounce water, and pour the rinsings upon the residue. When this has passed through, wash the filter and residue with 20 cc. = ·66 fluidounce of water, applied drop by drop around the edges of the filter, and upon the contents. When the filter has drained, there should be about 70 cc. = 2·33 fluidounces of the weaker solution. This (120 + 70 =) 190 cc. = 6·33 fluidounces of total solution will practically exhaust almost any sample of 10 grams = 154·32 grains of opium. But occasionally a particularly rich opium, or one in coarse powder, or an originally moist opium which has by slow drying become hard and flinty, will require further exhaustion. In all such cases, or cases of doubt, the residue should be again removed from the filter and shaken with 30 cc. = 1 fluidounce of water, and returned, and be again washed as before. The filter and residue are now to be dried until they cease to lose weight at 100°C. = 212°F. If any residue remains in the bottle, the bottle is also to be dried in an inverted position and weighed. Evaporate the weaker solution in a tared capsule of about 200 cc. = 6·66 fluidounces capacity, without a stirrer, on a water-bath until reduced to about 20 grams = 309 grains. Now add the 120 cc. of stronger solution, thereby subjecting this portion to the shortest practicable heating with least injury to the alkaloid—and evaporate the whole again to about 20 grams = 309 grains. Cool the capsule and contents, and when cool add 5 cc. = ·17 fluidounce of alcohol (s. g. ·820) and stir until a uniform solution is obtained, and no extract adhering undissolved on the capsule. If this solution should contain an appreciable precipitate, as from rare specimens of opium it will, it must be filtered, and the

filter be carefully washed through. Then the filtrate must be evaporated to 25 or 30 grams. Pour the concentrated solution from the capsule into a tared flask of about 100 cc. = 3·33 fluidounces capacity, and rinse the capsule into the flask with about 5 cc. of water used in successive portions. Then, if the solution has not required filtering, add 5 cc. = ·17 fluidounce more of alcohol. If it has been filtered and evaporated add 10 cc. = ·33 fluidounce of alcohol and shake well. Then add 30 cc. = 1 fluidounce of ether, and again shake well.

This shaking together first of the watery solution and alcohol causes the alcohol to combine with the water before the ether is added. The ether then added, the second shaking saturates the watery solution and combined alcohol with ether, and then the mixture is ready for the precipitation of the alkaloid under the most favorable condition.

Add now 4 cc. = ·133 fluidounce of solution of ammonia, of 10 per cent. (s. g. ·960) and shake the flask vigorously until the crystals begin to separate. Then set the flask aside in a cool place for 12 hours, that the crystallization may be completed.

This shaking secures the crystallization in very small crystals, so as to be easily washed and not adherent to the flask. The crystals will then be found partly at the bottom of the flask and partly in the ether at the surface of the lower dark, watery solution. If the shaking be frequent and vigorous, two or three hours' time will be sufficient to complete the crystallization, or if it be continuous, half an hour will be sufficient, but as a general rule it is better to allow the flask to stand over night. When there is no haste, a very good method is to macerate the opium over one night—prepare the solution during the day, and allow the second night for completing the crystallization. Then finish the assay on the second day. If there be haste, however, the assay may be completed iu one day by the vigorous and frequent shaking above indicated. Indeed, maceration without agitation or percolation is comparatively useless after the powder to be exhausted becomes completely saturated; and crystallization in a dense liquid like this is very slow if convection or liquid diffusion be depended upon; but agitation brings all parts of the liquid so thoroughly in intimate contact, that an half-hours' vigorous agitation must be fully equal to twelve hour's standing without agitation.

Pour off the ethereal stratum from the flask, as closely as possible, onto a tared filter of about 10 centimeters = 4 inches in diameter, well wetted with ether. Add 20 cc. = ·66 fluidounce of ether to the contents of the flask, rinse round without shaking, and again pour off the ethereal stratum as closely as possible onto the filter, keeping the funnel covered. When the ethereal solution is nearly all through,

wash down the edges and sides of the filter with 5 c.c. = ·17 fluidounce of ether, and allow the filter to drain with the cover off. Then pour on the remaining contents of the flask and cover the fuunel. When the liquid has nearly all passed through, rinse the flask twice with 5 cc. = ·17 fluidounce of water each time, pouring the rinsings with all the crystals that can be loosened onto the filter, and dry the flask in an inverted or horizontal position, and when thoroughly dry weigh it. Wash the filter and crystals with 10 cc. = ·33 fluidounce of water applied drop by drop to the edges of the filter. When drained, remove the filter and contents from the funnel, close the edges of the filter together, and compress it gently between many folds of bibulous paper. Then dry it at 100° C. = 212° F. and weigh it. Remove the crystals of morphia from the filter, brush it off and re-weigh it to get the tare to be subtracted. The remainder, added to the weight of the cryslals in the flask, will give the total yield of morphia, in clean distinct small light-brown crystals.

Take a small portion of these crystals, rub them into very fine powder and weigh off ·1 gram = 1·54 grain. Put this in a large test-tube fitted with a good cork and add 10 cc. = ·33 fluidounces of officinal lime water. Shake occasionally, when the whole of the powder should dissolve. (Absence of narcotine), (Flückiger.)

In pouring off the ethereal stratum from the flask as closely as possible, a little of the dark liquid and crystals will pass in with it, but this is of no consequence. The second portion of ether is added to dilute the remainder of the first, so as to get as much of it as possible separated before the watery liquid is poured into the filter, because this first ether contains all the narcotine and oily matters of the solution, and as the ether evaporates off from these they are deposited in the filter and with the morphia, and would be weighed with it. During this ethereal filtration the funnel is kept closely covered to prevent this evaporation and precipitation, but after the edges have been washed down with fresh ether, and the whole has passed through, there is so little of it left with the watery portion, and that little is so diluted that the whole may be poured on together. In adding the last or diluting portion of ether to the flask it is a little better to shake the whole contents together vigorously, but then it becomes necessary to wait a half hour or more for a complete separation before the ether can be poured off well. In pouring off this second portion, in order to leave as little ether as possible in the flask, it must be done very slowly, and toward the last, in order to get it close, a cubic centimeter or two of the dark liquid will pass out with it, but this is of no consequence, as it does not interfere with the ether filtration. The ether-wet filter does not

filter the watery solution rapidly, and with some opiums very slowly, indeed. And when this occurs the crystals are always darker and more likely to contain narcotine. When the filtration is so slow as to be impracticable, another assay must be made up to the point of the filtration. Then the filter must be wetted with water instead of ether, and the dark watery solution be filtered first. This is easily done by covering the mouth of the flask with the end of the finger and slowly inverting the flask. The dark liquid will then occupy the neck and can be let out slowly onto the filter to the last drop, leaving the whole ethereal liquid in the flask. The operator should be careful that no crystals remain on his finger. When the dark liquid has all passed through, the filter should be well washed with about 10 cc. of water, and be dried. Then the ethereal liquid and the remainder of the crystals should be poured on, and the flasks be well rinsed with ether and the rinsings be poured on the filter with as many of the loose crystals as possible. The filter should next be washed down with 5 cc. of ether and be again dried. Then the flask should be rinsed out twice with 5 cc. of water each time and the rinsings poured onto the filter, and the sides be finally washed down with water. It is very difficult to dry a substance completely in a flask if there be enough of the substance to form more than one thin layer of particles at any point, and, therefore, as few crystals as possible should be left in the flask. Usually, with good management, the quantity is only a few milligrams. The nearer to an inverted position that a flask can be placed without closing its mouth too much, the more quickly it will dry, because the heavier, moisture-charged air can then continuously run out and be replaced with dryer air. If the flask be not rinsed out with water last, a weighable quantity of ether residue will remain in it with the small quantity of morphia. After the filter has drained in the funnel, it will still contain a very considerable amount of liquid holding soluble matters which should not be dried with the morphia, hence the necessity of removing it from the funnel, folding its edges together as it was before it was opened, and placing it between folds of bibulous paper. If a light weight be laid upon the folds of paper and the filter, to keep a little pressure upon them, the paper will draw out as much of the washings as it can hold, and thus not only remove accidental matters in solution, but greatly facilitate the drying in a short time. The taring of the filter before using is not important, but is very useful as an indication of how well the filter and contents may have been washed, for the difference in tare before and after use shows how much weighable matter has been left in the paper when the water was evaporated off, and by inference how much was left in the morphia, though the amount in the morphia is of course much smaller than in the paper. This difference in the weight of the filter before and after use, in fair average opiums, will not exceed 4 or 5 milligrams, and should never exceed a centigram. Adulterated and mixed opiums usually give greater differences and give darker crystals.

In the weight of the crystals obtained, the moving of the decimal point of the metric weight one figure to the right, of course gives the percentage of morphia.

This process, according to the skill and care with which it is managed, will give uniform results to within two or three-tenths of a per cent., and will give a true account of the morphia in all unadulterated opiums probably to within a quarter of one per cent. and the results are believed to be too low rather than too high. Adulterated opiums, however, are much more difficult to assay and yield crystals which are always darker and less clean, and therefore the results are almost always too high. Poor opiums, on the other hand, are very easy to assay, and usually give very light colored clean morphia. The results here are liable to be too low, because when the quantity of morphia is small the alcohol and ammonia used are proportionately too large, so that much morphia may be retained in the mother-liquor. Therefore, when the morphia comes out very white and in small proportion, the assay should always be repeated, evaporating the solution to 10 grams instead of to 20, and adding 5 cc. of alcohol instead of 10, and 2·5 or 3 cc. of ammonia instead of 4.

The lime-water test for the narcotine in the results of the assay is quite sufficient, since nothing except coloring matter is so likely or so liable to be present as narcotine. The only difficulty is to know when the lime-water has surely dissolved all that it will dissolve. This is facilitated by having a very fine powder, and then good judgment is required to know the value or significance of undissolved residues when they are small.

The above process is very easily applicable to the assay of such preparations of opium as the tincture, deodorized tincture and compound solution. For the assay of these:

Take of the liquid preparation 120 cc. = 4 fluidounces. Evaporate at a low temperature to 10 grams = 155 grains, and from this point proceed exactly as in in the above process, using, however, 5 cc. of alcohol instead of 10 and 2·5 to 3 cc. of ammonia instead of 4.

This quantity of the liquid preparations is equal to about 150 grains, or a little less than 10 grams of the opium from which they were made, if made by the officinal process. The yield of morphia should be not much less than 1 gram = 15·43 grains, = 4 grains to the fluidounce, nor more than 1·5 gram = 23·15 grains = 5·8 grains to the fluidounce.

If the preparations were made by assay, and bear the assay value upon the label, then the yield of morphia should agree with the assay on the label within two or three-tenths of a grain to the fluidounce, or in proportion to the skill and success of the assay; but there will always be some loss.

Notwithstanding all the elaborate detail and repetitions with which the writer has, perhaps, overloaded this process, there are few who will be successful with it until after two or three trials; and the younger physicians and pharmacists upon whom must fall the responsibility of upholding the standards of the materia medica,—to whom these elaborate details are addressed,—should not be discouraged if very many trials be needed to render them expert enough to obtain tolerably accurate and uniform results.—*Ephemeris*, No. 1.

GLEANINGS IN MATERIA MEDICA.

BY THE EDITOR.

Chelidonium majus contains, according to Haitinger, notable quantities of citric acid, besides the previously known chelidonic and malic acids.—*Monatsh.* Ch. ii, 485.

Lupinine is an alkaloid, recognized by Campani in the seeds of Lupinus albus. Betelli prepares it from the decoction of the seeds, by treating it with lime, concentrating the filtrate and exhausting this with ether. The alkaloid is precipitated by tannin and the chlorides of platinum and mercury, reduces gold solution and silver nitrate, crytallizes from benzol in needles, is dissolved from the alkaline aqueous solution by agitation with ether, benzol and chloroform, has a very bitter taste, and is poisonous to frogs, but apparently not deleterious to man, even if given in rather large doses.—*Gaz. chim.*, xi, 237, 240; *Phar. Ztsch. Russl.*, 1882. 31.

M'boundou or Icaja poison contains, according to E. Heckel and F. Schlagdenhauffen, only one alkaloid, strychnine, which is not colored red by nitric acid and is therefore free from brucine.—*Jour. Phys. Chim.*, v, 34; *Chem. Ztg.*, 1882, 27.

Abrus precatorius.—The seeds, which weigh on an average $2\frac{3}{16}$ gr., are poisonous. Prof. C. I. H. Warden did not succeed in isolating the poisonous principle, but obtained a white crystalline acid and an oil. *Abric acid* was obtained by exhausting the seeds with boiling alcohol; its formula appears to be $C_2H_{24}N_3O$; it is slightly soluble in cold, but dissolves in boiling water, crystallizing on cooling, and with bases forms well-defined crystalline salts. The physiological experiments gave the following results:

a. The mixture of half a seed with cold water, injected into a cat's thigh, produced fatal effects in from 18 to 30 hours. No effects were

apparent for 8 or 10 hours; then a gradual disinclination to move supervened, which slowly increased until the animal was unable to move; the respiration became shallower, the animal remained on its side and slowly died. No convulsive movements, diarrhœa or vomiting were observed.

b. The extract made with boiling alcohol was inert.

c. The residue, extracted with boiling alcohol, had no effect.

d. Abric acid and ammonium abrate are inert.

e. Neither the aqueous distillate of the seeds, nor the residue left in the retort, produced any symptoms.

f. The extract made with cold alcohol, by spontaneous evaporation, produced no effects.

g. The etherial extract produced fatal effects with the usual symptoms; in a second experiment no effects were produced.

It would appear that the temperature of 100°C. destroys the activity of the poison.—*Chemists' Jour.*, March 3; *Drug Reporter.*

Oxalis acetosella.—Dr. Edgar Eltinge reports in the "Annals of Anatomy and Surgery," that the expressed inspissated juice of this plant, properly formed into a suitable paste, has been successfully used by him as a local application in the removal of an epithelioma of the lip, after no especial good had resulted from the use of Canquoin's zinc chloride paste which had produced excessive hemorrhage. Three successive applications of the wood-sorrel paste, made at intervals of twelve hours each, were entirely sufficient to destroy the growth, the resulting eschar separating on the eighth day, leaving a healthy granulating surface, which healed rapidly. Not a drop of blood issued throughout, and at the end of two years there were no signs of recurrence. The pain produced by the application of the caustic was intense, demanding all the patient's fortitude to enable him to endure it; however, the duration did not exceed half an hour after each application.

Pure Olive Oil, nine parts, gently warmed with 1 part of nitric acid, sp. gr. 1·42, and then agitated until cold, yields, according to Conroy, in the course of one or two hours a straw-yellow solid mass, while the oils of cotton-seed and other seeds become deep orange colored and do not acquire the solid consistence of olive oil; five per cent. of seed-oils may thus be detected.—*Journ. de Mèd.*; *Zeits. Oest. Ap. Ver.*, 1882, p. 20.

THE MICROSCOPE: HINTS TO BEGINNERS.

By Robert Aitken.

As the microscope is becoming more and more an indispensable instrument to chemists and druggists, the following hints on its use, and a description of the various methods of mounting, may be of service to those desirous of becoming familiar with such a fascinating study as that of microscopy.

One or two remarks may be first made with regard to the choice of an instrument. First, the stand or base ought to be heavy, to prevent shaking; and, secondly, the field of vision should be quite free from color. If the microscope be not of first-class workmanship it may show a variety of colors round the edge of the field, thus rendering it useless for scientific investigation; but if a microscope is purchased from a good maker there is little danger of finding these defects. Another and very important test is its clearness of definition. This is usually tested by some special object, and a very good one is a diatom, one of those very minute vegetable organisms which require a high power to bring out the markings on the siliceous envelope.

Presuming that a satisfactory instrument has been obtained, with directions for working the accessory apparatus, I will now describe the methods of dissecting and mounting the different vegetable tissues. This branch of microscopy is chosen for several reasons, one of which is that students in botany take far more interest in vegetable histology if sections are seen with the eye, than from engravings shown in botanical works; and I therefore consider it a subject of great interest to those preparing for their examinations. Another reason is that specimens for such a study can be obtained all the year round with very little trouble.

Before proceeding, it will be necessary for the worker to have ready several glass slips with ground edges (these are to be preferred to the rough-edged slips, as the latter are liable to scratch the stage of the microscope), a dozen or two thin glass circles about $\frac{3}{4}$ inch in diameter, a razor, watch glass, and several fine-pointed needles, with handles made of cedar-wood, similar to those used for camel-hair pencils. It will be found advantageous to have one or two of the needles bent a little at the tips; this can easily be done by holding one in the flame of the spirit-lamp until it is red-hot, and then bending with a pair of pliers.

The worker having got together the above requisites can now proceed with the dissection of vegetable tissues. Procure a leaf of the ordinary laurel, or one of the spotted laurel (*Aucuba japonica*); with a pair of scissors cut off a portion, insert it, edge in, into a soda-water cork, which has been previously slit with a knife at one end; then hold the cork in one hand, and with the other take the razor, dip the blade in water, and shave off several slices of cork and laurel-leaf as thin as possible. A dozen slices may be cut while one's hand is in; then float them all into a saucer half filled with water, and with a needle select what seems the thinnest section of leaf, transfer this to the centre of a glass slip, put one or two drops of water over it, and then lower a glass circle gently over this; this

is done by holding the circle between the thumb and forefinger of the left hand inclined over the object, and letting it fall gently on the object with a needle held in the other hand.

Having thus temporarily mounted a section, transfer it to the stage of the microscope and first apply the 1-inch power and shallow eye-piece; this will give a general outline of the section, provided it has been cut sufficiently thin. Presuming that such has been obtained, it represents a vertical section of the laurel leaf, and will show the different shaped cells, and their arrangement with each other. This will be better observed if the ½-inch power is used. The cells of the outer row corresponding to the upper blade of the leaf are tabular in shape, and look not unlike bricks and mortar; below these is seen another row of cells, ovoid in shape, and placed, as it were, on end. Within these cells green granules will be observed, surrounded by a mucilaginous fluid; this is chlorophyll, the fluid being the protoplasm, which sometimes gives a dimness to the object unless it has been sufficiently washed. Occasionally a cavity or blank space will be seen in a section of the leaf, having a small opening at the top; this is an air-chamber, and the opening above is a stoma. The above section may be taken as a fair example of the parenchymatous tissue. If it be desired to mount the specimen permanently, it had better be put for the present in some preservative fluid, such as a mixture of spirit and water, and labeled what it is.

In the cells of the section just made were seen chlorophyll and protoplasm, but there is a third and very important substance present in the cells of many plants, this being starch. To observe the granules *in situ* make a thin section of a piece of raw potato, place it on a slide with a drop or two of water, cover with a circle as already described, and apply a ¼ inch power. The granules of starch will be seen lying in the cells, and showing that the potato is principally composed of this substance.

When starch granules are viewed by polarized light, on rotating the analyzer of the polariscope they show a beautiful black cross; this is one of the best tests for this substance in adulterated powders.

To view the cells and stomata of the epidermis place a portion of laurel or ivy leaf in strong nitric acid to which a little water has been added; boil this in a beaker over a Bunsen or on a sand-bath, and, after boiling for several minutes, the epidermis will separate as a thin skin from the remaining portion of the leaf; the contents of the beaker should then be thrown into a plate full of water, and the epidermis removed to another vessel, where it should be well washed; when thoroughly freed from the acid, cut off a small piece and place it on a slide in the usual manner, and view first with a 1-inch and then with ½-inch power; this will give a capital view of the epidermal cells and stomata, the latter being made up of two semi-lunar cells placed together.

Spiral vessels will be found in common garden rhubarb; a good way to obtain these is to peel off a few strips from the stalk of the plant, let them macerate in water for a few days, then with the finger and thumb separate the soft portions from what seem like stout threads; take one of these, place it in a watch glass or small porcelain dish with a little water in it, and, with a needle in each hand, gently tease out this thread. This will

require a little patience, without a good supply of which no one can be a successful microscopist. After teasing it out as much as possible, select the thinnest strands and place them on a slide; examine with a pocket magnifier, and if you have separated a spiral vessel transfer it, by means of a bent needle, to another slide; place a drop of water on it and cover with a glass circle, then examine with a 1-inch power, which will show the spirals well. They are rather delicate objects, and if much meddled with will easily break. Double spirals can be seen in thin shavings of the yew-tree, but require a very high power to show well. They give great strength and elasticity to the wood; hence its use in olden times in the manufacture of bows.

Disc-bearing cells will be found in any coniferous wood—common deal or the ordinary cedar-wood of pencils. Very thin sections with the razor will show the cells without any previous treatment; a very thin shaving with a carpenter's plane is even better than one made by the razor, as the plane makes the section of a uniform thickness, which is apt not to be the case when the razor is used.

Scalariform vessels are easily found in ferns, a longitudinal section from a tree-fern giving a good specimen. By making an oblique section near the base of the stalk of the common hart's-tongue fern one will find a very good example of this kind of tissue.

Plant hairs are so common that a notice of one or two of them will be sufficient. A favorite slide among microscopists is one showing the stellate hairs of the deutzia. They are found on the surface of the leaf, and are usually shown as an opaque object under condensed light; by this is meant the shutting off of the rays of light from the reflecting mirror with the diaphragm, and throwing on the object a beam of light obtained from the side condensing lens. The column of the monadelphous stamens of the common mallow have beautiful hairs, which under polarized light are lovely objects. They are obtained by cutting away the staminal portion of the flower, and placing it longitudinally in a slit made in a small phial cork; with the razor make a very thin slice, which will most probably adhere to the blade; this must be washed off into a small saucer, and then transferred to a glass slip for examination in the usual way; if a satisfactory specimen has been obtained, it ought to be placed in a little spirit and water in a very small phial until it is required for mounting. Nux vomica seeds are covered with very fine hairs, which give them that silky appearance and feeling between the fingers; they likewise make good objects for mounting, as they show well when viewed by polarized light.

In order to observe that very interesting sight, the gyration of the cell contents, several water plants, such as chara, nitella, and anacharis, may be chosen to advantage. Anacharis is easily obtained from any canal or river; it is commonly known as water thyme, or the new river weed, and is an exceedingly quick grower, as is shown by the fact that though only introduced about fifty years ago, yet it has overrun Great Britain and choked rivers and canals until it has become a positive nuisance. If a leaf of this plant be laid on a slide, a drop of water placed on it and covered with a circle, it will show under a ⅛-inch power the circulation of the

cell. Sometimes it is slow to commence, as the shock to the leaf, caused by its separation from the stem, seems to suspend the cell movement. By gently warming it over a lamp, and waiting for a few minutes, the circulation will soon be seen. Viewed by the microscope, the movement is from left to right, but as objects are reversed when seen through the instrument the movement is of course the opposite way.

Before proceeding to describe the different methods of mounting, it is necessary to call the attention of the worker to one essential, and that is, cleanliness. Every slide and cover previous to mounting must be thoroughly washed, and finally wiped dry with a piece of chamois skin or cambric handkerchief; no cloth ought to be used that gives off fluff. Moreover, when working with the instrument, care should be taken that it is done in a room where there is little dust, as this latter interferes sadly with one's operations.

Objects are mounted in various ways, as transparent objects or opaque. The transparent can be mounted in two ways, either dry or in fluid. I will begin with the transparent method, and give a list of the articles required: Canada balsam, dammar solution, glycerin jelly, gold size, spirits of wine, oil of cloves, turpentine, and camphor water. Dammar solution is made by dissolving equal parts of gum dammar and mastic in benzol; a recipe for glycerin jelly will be found in the "Pharm. Journal," Third Series, vol. v. Mr. Pocklington reccommends chloride of barium as a preservative, but I find carbolic acid better. Unless the student is working largely, it is better for him to purchase small bottles of these preparations, as it does not pay to make them in very small quantities. Canada balsam and dammar are the two media most used for dry objects; they answer very well for hard woods or dense tissues, as the transparency of a section is much increased, more especially by the dammar.

To mount objects with the above, make a transverse section of some root, say, sarsaparilla, using a cork for embedding the root. Having procured a section sufficiently thin, soak it in turpentine for a day, then transfer to the centre of a glass slide, which must be perfectly clean, gently warm the slide, and with a glass rod drop a small quantity of balsam or dammar over the object, taking great care not to have any air-bubbles. Having previously cleaned the glass circle by breathing on it and gently rubbing between the thumb and forefinger with a cambric handkerchief, warm it, and let it down gently on the balsam, as previously described for temporary mountings. By this method a slight wave is given to the balsam, which helps to drive out the air-bubbles. The slide should then be put aside in a warm place for a week or two, until it is thoroughly hardened, after which it should be cleaned from the superfluous medium with a penknife, and, finally, with a small rag soaked in turpentine. It may then be covered with ornamental paper, having a hole punched through the centre, or else finished with a ring of gold size run round the circle to preserve it; this ring is easily put on with a Shadbolt's turntable, which is a circular plate (usually made of metal) spinning round on a pivot, the slide being fixed with clips to the table, and, while rotating, a camel-hair pencil charged with the cement is held at one side of the circle, and in the

spinning it takes on a neat circle of cement. Should air-bubbles be present in the medium, they can easily be removed before mounting by heating a needle-point and touching the bubbles; if they are detected after mounting they may disappear in the drying, but it is best to thoroughly examine the balsam before covering, and thus prevent the vexation caused by their presence.

In the above description it is recommended to make a section from the dry wood. In some cases such a section will be found, after soaking in the turpentine, to be slightly curled; it ought then to be put between two glass slips held together by a clip until quite flat, or else before making the section let it soak in water for a day or longer, according to the thickness of the wood, and then slice it; but in order to mount it in balsam it must be steeped in spirit, then in oil of cloves, then in turpentine, and lastly mounted in the balsam.

In mounting an object in fluid you have to take into consideration the nature of the substance and the suitability of the medium. The fluids used are camphor water, glycerin, and various solutions. Glycerin is not recommended for many vegetable substances, as it is liable to rupture the cell wall. I have found camphor water a very good preservative, having mounted starch granules in it about six years ago, and at the present time find them as good as when first mounted. To mount an object by this method, procure either a slide with a sunk cell, that is, the glass hollowed out in the centre (these can be had from any optician), or else make a cell with a ring of gold size, not so wide as a glass circle, on a plain slide. This is usually done by the turntable as mentioned above. After the cement is dry, the cell should be filled to overflowing with camphor water, and the object, such as a piece of cuticle, immersed in it; the cover is then to be carefully let down, taking the precaution to see that no air-bubbles have been imprisoned. The next stage is to remove the superfluous water from the sides of the cell; this is done with a little blotting-paper, taking care not to bring it too near the edge of the cell, otherwise it will draw out some of the liquid, thus causing air to enter, and necessitating remounting. Having now removed the superfluous moisture without disturbing the cover take a camel-hair brush dipped in gold size or other cement, and paint round but not on the circle. When dry, paint afresh, gradually getting nearer the cover, but always remembering to allow each coating of cement to dry; finally include the edge of the cover about the eighth of an inch, or a little less; and, in order to give neatness to the slide, a ring of some cement should be put on with the turntable.

Mounting in glycerin jelly is much easier than the above, more like mounting in balsam, and, as it answers for many objects, and is easily worked, it is in great favor among microscopists. Make a thin longitudinal section of some soft stem, such as chickweed, wash it well, drain, transfer to a slide gently warmed, take a glass rod, dip it into melted glycerin jelly, and allow a drop or two to fall over the object until you think there is sufficient, of course looking out as before for air-bubbles; warm the glass cover and let down gently; put aside for half an hour, and it will then be ready to receive a ring of cement or paper cover.

When it is desired to mount sections of substances containing water, in balsam or dammar, the plan usually followed is to soak first in spirit, then in oil of cloves, then in turpentine, and finally in the balsam.

Some objects are mounted without any medium; they are simply fastened to the slide either with or without gum, and covered in the ordinary way. Among such may be mentioned thin shavings of deal, mahogany, elm, etc., which, of course, ought to be taken from dry, seasoned wood.

Opaque objects require the side condensing lens for their illumination. Glass slips are unnecessary, slips of wood being usually employed. Procure a piece of wood, make it of the same width and length as a glass slip, but hardly so thick; then get a piece of cardboard of moderate thickness, cut it to the same width as the slip, and about half the length; punch a hole right through, not so large as the diameter of a glass cover; gum it to the wood slip and allow it to dry. After the gum is quite dry, put into the cell now made a few drops of Brunswick black or strong mucilage; set aside to harden in a place free from dust, and when ready, place the object upon it; then cover with a glass circle, touched at the edges with gold size, and finish by covering with ornamental paper. If mounted on the Brunswick black it will fasten itself, as this cement gives with the weight of the object (provided it has not been dried too much); if mounted on the gum it will be necessary to breathe upon it for a few seconds, and then place the object on it. Of the two substances here mentioned Brunswick black is the best, as it shows a good dark background to the object. Pollens, seeds, and hairs are often mounted in this way, more especially the two former. The pollen of the mallow is a great favorite from its pretty appearance. Seeds, if large, are best fastened with a little gum to the glass, on the underside of which a piece of dead-black paper should be pasted. If hairs are shown under condensed light, it is better to let them remain on the leaf, unless a good dark background can be given.

Where the worker is at a loss to know the proper medium in which to mount his object, his best plan is to try all the methods. By this means he finds out which is best suited for the object, as well as the knowledge it gives him for future cases of a similar nature.

Before closing, I would again caution the student in microscopy to be very scrupulous in the matter of cleanliness, both with his instrument and his tools, and not to use anything but a piece of soft and well-beaten chamois skin to clean the lenses when dimmed or soiled.—*Chemist and Druggist*, Feb. 15, 1882.

MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, April 18, 1882.

Mr. Robbins, in the absence of the President, was called to the chair.

The minutes of the last pharmaceutical meeting were read, and there being no corrections suggested, they were approved.

Professor Maisch read a paper upon *Chia seed*, by Mr. Hiland Flowers, a graduate of this College, and followed the reading of it with another, the

results of his own studies upon the literature of the subject; these papers were both listened to with a great deal of interest and were referred, upon motion, to the Publication Committee (see pages 227 and 229).

Dr. Wolff was asked whether he had made any further investigations upon the chlorinated oils, which had been the subject of discussion at the last pharmaceutical meeting. In reply he stated that he had continued his experiments and they tended to show the correctness of Prof. Sadtler's views about the formation of substitution compounds, the displaced hydrogen combining with a portion of the chlorine to hydrochloric acid, and another portion of the chlorine taking the place of the hydrogen thus removed; when the investigation in progress shall have been completed he hoped to present a paper upon the subject at an early meeting.

Dr. A. W. Miller asked permission to read a paper from the "Chicago Pharmacist," of January last, upon the trade in *proprietary articles*. As the College does not recognize in any manner such articles the Chair decided it could only be done by a vote of the meeting, which was taken and permission granted, it being understood that the subject could not appear in the reports of the meeting. After the reading there was some discussion relative thereto, and the whole subject was recommended to be referred to the next meeting of the Trade Association of Philadelphia Druggists, an association specially organized to take cognizance of all matters of *trade* interests.

Mr. A. P. Brown exhibited a few *micro-photographs* which elicited expressions of admiration from those who examined them at the success obtained in illustrating minute objects in this way.

There being no further business, the meeting adjourned.

T. S. WIEGAND, *Registrar.*

PHARMACEUTICAL COLLEGES AND ASSOCIATIONS.

THE MASSACHUSETTS COLLEGE OF PHARMACY held its fourteenth annual commencement in the College Hall on the evening of April 5th, when the President, M. Solomon Carter, conferred the degree of Graduate in Pharmacy upon the following candidates: Nathaniel Herbert Clark (Gamboge), Richard Barker Dawson (Seidlitz Powders), Henry Eugene Fleming (Adulteration of Rhubarb), Franklin Willard Freeman (Lime Water), Lyman Whitney Griffin (Tinct. Opii), Daniel Hirth (Syr. Senegæ), Edgar Clarence Maxey (Tinct. Rhubarb), Edward Franklin Otis (Myrrh), Edward Ellis Ray (Citrate Iron and Quinine), George Melzar Stetson (Iron), Jas. Henry Thompson (Liq. Potassæ), and Henry Thacher (Syr. Iodide of Iron). The degree was granted "with honors" to J. H. Thompson for having passed a satisfactory examination in the elective department of practical and analytical chemistry. Prizes were granted as follows: For recitations in junior class to W. R. Whittier (National Dispensatory), and in senior class to H. N. Hooper (Royle's Materia Medica and Woehler's Chemistry); for written examinations in junior class to

F. E. Mayberry (National Dispensatory), in senior class to R. B. Dawson (Attfield's Chemistry and Thomas' Medical Dictionary). The valedictory addresses were delivered on behalf of the class by J. H. Thompson, and on behalf of the faculty by Prof. G. F. H. Markoe.

THE NATIONAL COLLEGE OF PHARMACY at Washington, D.C., held its annual meeting on April 3d, when the reports of the various officers and committees were read. The reports show that during the past year a considerable sum was expended for increasing the means of instruction. Owing to the want of a separate room for instruction in analytical chemistry this branch had to be postponed until the close of the lectures, but arrangements are being made for giving hereafter this instruction during the regular course. The commencement will be held about June 1st.

The following officers were elected for the ensuing year: President, W. G. Duckett; Vice Presidents—Charles Becker, Carl Kullberg; Secretary, J. R. Walton; Treasurer, J. A. Milburn; Trustees—W. S. Thompson, G. G. C. Simms, R. B. Ferguson, J. D. O'Donnell, A. M. Read, B. K. Helpenstine and C. H. Mourse.

PITTSBURG COLLEGE OF PHARMACY.—At the meeting held April 11th, the election of officers and of trustees resulted as follows: President, Geo. A. Kelly; Vice Presidents—Joseph Abel, Francis H. Phillips; Secretary, Albert H. Wilson; Treasurer, Jos. Kimmel; Corresponding Secretary, Jas. B. Cherry; Curator, Wm. G. Schirmer; Trustees—N. McClarran, F. H. Eggers, H. Schmidt, A. S. Bender, L. Emanuel, Jas. Kerr, Jr., Peter Weber, S. H. Stevens, A. C. Robertson, S. S. Holland, M. J. McGann. Among the committees appointed was one on legislation, to act in conjunction with a similar committee appointed by the State Pharmaceutical Society to further the enactment of a general law regulating the practice of pharmacy in the State.

CINCINNATI COLLEGE OF PHARMACY.—The tenth annual commencement was held on the evening of March 15th, at the College Building, before a large audience. The opening address was delivered by the President, Joseph H. Feemster, and addresses on behalf of the Board of Trustees by Rev. Thomas H. Vickers, Rector of McMickan University, and on behalf of the Faculty by Prof. E. S. Wayne. The degree of Graduate in Pharmacy was conferred by the President upon the following:

Robt. Bingman,	Jas. Hausman,	J. W. Reakirt,
L. E. Burgess,	Charles Keller,	Chas. Smedley,
Alb. Dann,	J. C. Krieger, Jr.,	P. M. Streich,
Con. Ebert,	Ch. Langenbeck,	W. D. Waggoner,
C. C. P. Fennel,	E. H. Latham,	B. F. Weeks,
Jul. Fredrichs,	Ferd. Ott,	Nathan Wolf.

The Alumni gold medal for the best general average in the examination was awarded to Chas. C. P. Fennel, who received also the prize for the best examination in chemistry, Chas. Smedley the prize in pharmacy, and Charles Langenbeck the prize in materia medica and botany. The

graduating class presented the College with a fine oil painting of Prof. A. Fennel.

In the Junior examination 23 students passed out of a class of 38.

THE ALUMNI ASSOCIATION OF THE NEW YORK COLLEGE OF PHARMACY, on April 18, elected L. M. Royce Treasurer, in place of S. H. Ambler, resigned, and considered amendments to the by-laws relating to the Treasurer's duties.

LANCASTER COUNTY, PA., PHARMACEUTICAL ASSOCIATION.—The election of permanent officers, held April 13, resulted as follows; President, Chas. A. Heinitsh, Lancaster. Vice President, Wm. F. Maulick, Columbia. Secretary, A. A. Hubley, Lancaster. Treasurer, H. B. Cochran, Lancaster. Executive Committee—Dr. B. F. W. Urban, Lancaster; Wm. F. Maulick, Columbia; A. G. Frey, Lancaster.

A discussion of several matters of interest to the profession followed, and a number of questions were proposed for discussion at next meeting.

The second Thursday of each month was selected as the time for holding stated meetings of the association.

EDITORIAL DEPARTMENT.

ADDITIONAL NOTE ON CHIA.—In "La Naturaleza," for 1881, a Mexican journal, received after the papers on Chia (pp. 227 to 234) had been printed, we noticed a paper entitled "Calendario Botánica del Valle de Mexico. Noticia de algunas plantas que caracterizaron la floracion en el año de 1879 por el Sr. Mariano Bárcena." In this paper it is stated that *Chia azul* is probably a variety of *Salvia patens*, Cav., and flowers during the months of June, July and August, while the more common *Chia* is *Salvia polystachya*, Ort., and is in bloom from June to October. The latter species is stated by Kunth to be shrubby, but DeCandolle describes it as herbaceous, with an erect, smoothish or somewhat pubescent stem, and with leaves which are 2 to 3 inches long, petiolate, ovate, acuminate, serrate, rounded or cordate at the base, on the upper side roughish-pubescent and on the lower side nerved, tomentose or pubescent, etc.

It will be observed that the description of Guibourt's plant agrees better with the above, with which it is most likely identical, than with either S. hispanica or S. Columbariæ.

The leaves of Salvia patens are crenate, ovate-deltoid, hastate at the base or the upper ones rounded.

THE LIQUOR DEALERS' LICENSE.—As most pharmacists object to being classed as liquor dealers, and as the internal revenue laws on this subject are about to undergo a change, the following resolution has been prepared by a committee of the Pennsylvania Pharmaceutical Association for insertion into the proposed new law; by this resolution the stigma and odium attached to the profession of pharmacy, under the present classification, is

entirely removed, and it is hereby earnestly requested that every pharmacist will send a copy of the resolution to his Representative at Washington and request him to advocate its passage.

That this resolution will be unsatisfactory to some, from the fact that it does not urge the removal of the tax, is fully understood by the committee, but in view of the undeniable fact that many in our profession do sell spirituous liquors for other than medicinal purposes, they could not, with any hope of success, ask for its absolute removal.

WHEREAS, Apothecaries or pharmacists, in the regular prosecution of their business, are compelled to sell in combination or in their pure form the various spirituous liquors, for the sale of which by this act a retail liquor dealer's license is required, *It is hereby provided* that any apothecary or pharmacist, who upon oath or affirmation declares that he does not propose or intend to sell such spirituous liquors as a beverage but only for medicinal purposes, shall upon the annual payment of a sum equal to the sum required for the retail liquor dealer's license, be exempt from taking out such license, and shall receive from the Collector of Internal Revenue a receipt setting forth this exemption. Said receipt need not be publicly exposed at his place of business, but must be shown to any internal revenue officer upon demand.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

Year-Book of Pharmacy, comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry contributed to British and Foreign Journals from July 1, 1880, to June 30, 1881, with the Transactions of the British Pharmaceutical Conference at the Eighteenth Annual Meeting, held at York, August, 1881. London: J. & A. Churchill. 8vo, pp. 560.

This valuable annual is in appearance and arrangement similar to the previous volumes. The first 290 pages are occupied by the "Year-Book"; then follows, upon 26 pages, a list of titles of pharmaceutical and allied books which have been published during the year; next the roll of members, and the minutes of and papers read at the last Conference meeting, of which a synopsis will be found on page 529 of our last volume.

Proceedings of the American Pharmaceutical Association at its Twenty-ninth Annual Meeting, held in Kansas City, Mo., August, 1881; also, the Constitution and Roll of Members. Philadelphia: Sherman & Co., Printers. 8vo, pp. 612.

As we go to press we learn that this volume will soon be distributed to all entitled to receive it. The report on the Progress of Pharmacy occupies 350 pages, the committee reports 34 pages, the papers read 74 pages and the minutes 50 pages. The price for the volume bound in cloth, by mail, will be $6; full sets of bound volumes, $68. In order to induce members to complete their sets, all the volumes, bound, up to 1872, inclusive, are offered for $20, and up to 1875, inclusive, for $30. Orders for Proceedings should be addressed to Prof. J. M. Maisch. It should be stated yet that the new volume will be embellished by a handsome portrait of the late Chas. W. Badger.

Proceedings of the California Pharmaceutical Society and College of Pharmacy; Report of the Thirteenth Annual Meeting, held at San Francisco, January 12, 1882. 8vo, pp. 117.

Abstracts of most of the papers of this pamphlet were published in our last number, pp. 175 to 180.

Proceedings of the Third Annual Meeting of the Missouri State Pharmaceutical Association, Kansas City, October 25, 1881. Pp. 22.

A brief account of the meeting was published on page 634 of our last volume.

Proceedings of the Alabama Pharmaceutical Association, First Annual Session, held at Birmingham, Tuesday, August 9, 1881.

The next meeting will be held at Mobile, May 9. The President of the Association is P. C. Candidus, of Mobile; Recording Secretary, S. W. Gillespie, of Birmingham; Local Secretary, Chas. A. Mohr, of Mobile.

Proceedings of the New Hampshire Pharmaceutical Association at the Eighth Annual Meeting, held in the city of Concord, October 11, 1881. Pp. 48.

For an account of the meeting see page 586 of our November number, 1881. The next meeting will again be held at Concord.

Twenty-fifth Annual Report of the Council of the Pharmaceutical Society of Victoria, 1882. Melbourne.

In addition to a condensed statement of the work done during the year, the pamphlet contains also a list of the members and honorary members of the Society.

The Pharmaceutical Register of Victoria for 1881. Melbourne.

The pharmacy act was passed in 1876. There are about 700 pharmaceutical chemists on the register at the present time.

An Ephemeris of Materia Medica, Pharmacy, Therapeutics and Collateral Information. By Edward R. Squibb, M.D.; Edward H. Squibb, S.B., M.D., and Charles F. Squibb, A.B. Brooklyn, N. Y.

This is a periodical intended to be issued from time to time with the object of noting down the results of a long experience and observation, and the deductions therefrom, together with occasional original work. American medicine and pharmacy, as well as science in general, may be congratulated that Dr. Squibb, aided now by his two sons, will publish such results as indicated. Thus far two numbers of the "Ephemeris" have been published, and the papers contained therein are written in the exhaustive style which characterizes nearly all his contributions to science. Perhaps the most important paper is the one on the morphine strength of opium, in which the author shows the quality of commercial

opium to be better than is often supposed. In 12 lots, comprising 230 cases, and amongst these four lots of opium of poor appearance, the minimum morphine yield was 9·6 per cent. and a maximum yield = 12·7 per cent. for crude opium. Commercial samples of powdered opium—excluding two, which had probably been reduced in strength by some gummy admixture and assayed 9·5 and 12·5 per cent.—were found to contain between 13·9 and 15·1 or an average of 13·52 per cent. of pure morphine; the strength of good powdered opium of this market is therefore 14 per cent., with a variation of about 1 per cent. between the extremes of morphine strength. These are important facts against the official recognition of opium of 10 per cent., which would necessitate the addition of admixtures that could only be regarded in the light of adulterations. The process adopted by Dr. Squibb for assaying opium is a modification of that proposed by Flückiger; the accurate results obtained by it depend in a great measure upon details, given in full in his paper, which we publish in this number. (See page 244.)

The other important papers relate to the adulteration bill before Congress, to clinical thermometers, to the elixir nuisance, and to the new code of ethics of the Medical Society of the State of New York. Other shorter articles on Chian turpentine, winter eczema, various salicylates, are likewise deserving attention.

Handwörterbuch der Pharmakognosie des Pflanzenreichs. Herausgegeben von Prof. Dr. G. C. Wittstein. Breslau: Eduard Trewendt, 1882.

Dictionary of Pharmacognosy of the Vegetable Kingdom.

We have before us Part 1 of this work, a handsome pamphlet of 144 large octavo pages, which is being published as a part of the "Encyclopedia of the Natural Sciences," comprising botany, zoology, pharmacognosy, mineralogy, mathematics, chemistry, physics and astronomy, and in course of publication since 1879.

As indicated by the title, the work before us is a dictionary, and its arrangement is therefore alphabetical. The most popular German names have been chosen for the heading, and where there is no common name in that language the commercial designation has been selected. This is followed by the different synonyms in the vernacular, then by the officinal Latin names as used in Germany, by the systematic names of the plants and the classes and orders of the Linnean as well as of the natural system. A brief characteristic of the plant is next given, including its habitat, and followed by a full description of the medicinal part, the principal chemical constituents, a description of substitutions or adulterations, medical uses, historical and etymological notes. As a specimen of the manner in which the subject has been treated by the author, we translate the article on a plant quite common in some parts of North America, and known here as *winter cress* and *yellow rocket.*

Barbarakraut.

(Winterkresse, Winterbrunnenkresse), *Herba Barbareæ.*

Barbarea vulgaris, R. Br. (*B. arcuata*, Sturm; *B. iberica*, D. C., *Erysimum Barbarea*, Lin.)

Tetradynamia Siliquosa.—Cruciferæ.

A perennial plant, with a fusiform-cylindrical white fibrous root, a 30 to 60 centimeters high, erect, above branching, smooth, angular-furrowed stem, and with alternate wand-like branches. The leaves are clasping, large, lyrate, crenate, auricled at the base, the terminal lobes roundish, the others obovate, smooth, somewhat glossy green, rigid. The small yellow flowers form terminal, dense, ovate racemes, which in fruit are considerably elongated. The younger pods are obliquely erect, 24 to 36 millimeters long, somewhat compressed, obtuse, four-angled, and contain oval-roundish, flat, yellowish-brown seeds. Frequent on the banks of rivers, on ditches and wet meadows.

Part Used.—The herb; its taste and odor are cress-like, but somewhat milder, the taste also bitter.

Principal Constituents.—Acrid volatile oil, bitter principle. Not analyzed.

Uses.—Fresh, like water cress and scurvy grass (cochlearia). The tender young leaves are eaten in winter (when they usually remain green) and spring as salad, or like spinach as pot herb.

Historical.—The plant seems to have first attracted attention in the middle ages. Camerarius (†1598) calls it *Bunium adulterinum*, and states it to be also known as *Carpentaria*, *Herba sancta*, *Fistularia* and *Nasturtium hyemale;* it was at an early date cultivated in German gardens, and particularly valued as a remedy for the cure of fistulas and sores.

The name Barbarea was probably chosen in honor of St. Barbara (from Nicomedia, in Asia Minor, about 300 after Christ). *Erysimum* from ἐρύω (to help, to save) in relation to its remedial properties.

In a similar manner the other drugs are described, those of greater importance being treated of more in detail, for instance, buchu, ipecacuanha, hyoscyamus, benzoin, valerian, asafœtida and others. The excellent and extensive article on cinchona barks is from the pen of Prof. Dr. Garcke.

It will be observed from the foregoing that the work, when completed, promises to be a most useful one for reference and information, equal to those by the same author which in the past have been deservedly regarded as standard works.

In regard to the scope of the work, it should be stated that it is confined altogether to drugs of vegetable origin, and among these not only those which are generally used in Europe at the present day have been selected, but likewise a large number of such which, though more or less antiquated or fallen into disuse, seem to deserve notice on account of their properties or constituents.

The typography being clear and attractive, and the paper good, the volume will be a handsome one, and thus, both on account of its internal value and convenience for consulting, as well as for its pretty appearance, will be an ornament of the pharmaceutical or medical library.

Album Micrographic d'Histologie générale comprenant l'étude comparée des tissus végétaux et animaux sous le rapport des textures cellulaires. Par L. Créteur. Bruxelles.

Micrographic Album of General Histology, embracing a Comparative Study of Vegetable and Animal Tissues.

This album contains about seventy lithographic plates, large quarto size, of microscopic drawings made by the accomplished author, and magnify-

ing the illustrated objects 500 or 1,000 diameters in most cases. The illustrations comprise starches, blood, urinary products, diatoms, animal tissues, parasites and a limited number of vegetable drugs. They are well executed, and give a clear and faithful view of the characters of the articles selected for examination.

The Practice of Commercial Organic Analysis. A Treatise on the Properties, Proximate Analytical Examination and Modes of Assaying the Various Organic Chemicals and Products employed in the Arts, Manufactures, Medicine, etc., with Concise Methods for the Detection and Determination of their Impurities, Adulterations and Products of Decomposition. By Alfred H. Allen, F.I.C., F.C.S., Lecturer on Chemistry at the School of Medicine and the Wesley College, Sheffield, etc. Vol II. Philadelphia: Presley Blakiston, 1882. 8vo, pp. 561. Price, $5.00.

The contents of the present volume evidently embrace the results of practical experience, and of careful scrutiny of the extensive literature on the subject of commercial analysis. The branches treated of comprise hydrocarbons, fixed oils and fats, sugars, starch and its isomers, alkaloids and organic bases.

The first section embraces the paraffins, terpenes, benzene and homologues, naphthalene and anthracene. For the soft paraffin or petroleum jelly the designation *vaselene* is suggested; with the synonyms cosmolene and saxolene, a change in spelling which renders the termination in accord with that scientifically adopted for analogous compounds. The essential oils, camphors and resins are briefly considered among the terpenes, embracing mainly oil of turpentine, turpentines and derivatives. Bees' wax, spermaceti and soap are very naturally considered among the fats, where we miss, however, allusion to cacao butter, which in American pharmacy is of not insignificant importance. In the chapter on starches, Prof. Prescott's lucid scheme of the proximate analysis of plants has been interpolated, which we think would have found a more appropriate place in an appendix. The last chapter is mostly devoted to the medicinal alkaloids; but aniline and its homologues and basic derivatives are likewise considered, without, however, entering minutely into the dyes and coloring matters, these being purposely omitted, as were also the animal products, like milk, urine, blood, albumen, etc. A distinction is made between some of the alkaloids, and there is evidently a typographical error in section B, where it should read "the pupil is *contracted*." The alkaloids mentioned there are morphine, physostigmine, strychnine and aconitine, the last one of which, we believe, produces only a transient contraction.

It will be observed that the scope of the work is of especial application to the wants of the pharmacist, who, like the professional analyst, will find it a very useful work, calculated to give the best practical means for determining the purity and identity of the compounds and products enumerated. The style is clear and free from superfluities, and very rarely needs further qualification, as, for instance, on page 55, where it is stated that "most of the *oxygenated* and sulphuretted essential oils have been

obtained by synthetical means." Only few typographical errors have been observed by us, one of these being the name of Soxhlet, which, on pp. 127 and 504, is spelled "Xoxheth."

Premiers Résultats des études sur la formation des Matières colorantes par voie électro-chimique. Exposés par Frédéric Goppelsroeder. 4to, pp. 24.

First Results of the Studies on the Formation of Coloring Matters by the Electro-chemical way.

A pamphlet printed in explanation of a large number of aniline-derivatives and other coloring matters obtained in the manner indicated and exhibited at the electrical exposition of Paris. As early as 1875 the author indicated his line of investigations, and some of the results obtained, in a communication to the Industrial Society of Mulhouse. The pamphlet contains four plates illustrative of the apparatus employed in these researches.

The Students' Guide in Quantitative Analysis; intended as an Aid to the Study of Fresenius' System. By H. Carrington Bolton, Ph.D., Professor of Chemistry in Trinity College, Hartford, Conn. Illustrated. New York: John Wiley & Sons, 1882. 8vo, pp. 127. Price, $1.50.

Quantitative chemical analysis can be undertaken only by one who has well mastered the various methods for the qualitative recognition and separation of the various elements and compounds, and in thus working has accustomed himself to accuracy. In commencing the determination of quantities articles are selected, beginning with the simpler compounds and proceeding gradually to the more complex and difficult ones. The book before us contains such a judicious selection of examples for quantitative analysis, and gives brief but ample directions for accomplishing the task, at the same time indicating the points requiring special study. It is well adapted for practical laboratory work, and while primarily intended for the beginner, also the more advanced student will find it a valuable "guide." The typography, illustrations, paper and binding are alike commendable.

Les Pyrénées-orientales et leur hydrologie. Par J. Léon Soubeiran.

The Eastern Pyrenees and their Hydrology.

A reprint from the Transactions of the Geographical Society of Languedoc, and accompanied by a geological map of the district described.

Illustrations of Dissections in a Series of Original Colored Plates. By Geo. Viner Ellis, Professor of Anatomy in University College, London, and G. H. Ford, Esq. Vol. II. Second edition. New York: Wm. Wood & Co., 1882. 8vo, pp. 226.

We have noticed the first volume of this valuable work in our February number, page 96, to which we refer for favorable comments, which apply alike to the book before us. This contains thirty plates, with the accompanying descriptive text, illustrating dissections of the perinæum, the abdominal parietes, the pelvis and the lower limb.

Lectures on Diseases of Children. A Handbook for Physicians and Students. By Dr. Edward Henoch. New York: Wm. Wood & Co. 8vo, pp. 357.

As dispensary physician, and subsequently as director of the clinic and polyclinic for diseases of children in the Royal Charité, and professor in the University of Berlin, the author has had an extensive experience in this field, covering a period of thirty-seven years, and, considering the many thousands of cases that have thus come under his immediate observation, has had ample material for writing a practical work, based almost exclusively upon personal experience. The subject matter is divided into ten parts, embracing diseases of the new-born, of infancy, of the nervous system, of the respiratory organs, of the circulatory organs, of the digestive organs, of the uropoëtic organs, infectious diseases, constitutional diseases and diseases of the skin. In an appendix a limited number of formulas are added, merely for the purpose of furnishing hints to younger physicians in beginning children's practice.

The volume forms a valuable addition to the present series of Wood's Library of Standard Medical Authors.

First Biennial Report of the Commissioners of Pharmacy for the State of Iowa, with abstract of State Pharmacy Register. Printed by order of the General Assembly. 1882. 8vo, pp. 81.

The pamphlet gives a full account of the systematic manner in which the Commissioners carry out the duties devolving upon them under the Pharmacy law.

Histoire et Origine de la Corporation des Chirurgiens et des Apothicaires d'Audenarde, dite des SS. Cosmes et Damien, depuis le XII^e^ jusqu 'au XIX^e^ siècle. Par L. Créteur, pharmacien-chimiste, etc. D'après les Recherches et les Traductions des Archives de la Ville d'Audenarde, par Th. Devacht, pharmacien-chimiste, etc. Bruxelles, 1882. 8vo, pp. 152.

History and Origin of the Corporation of Surgeons and Apothecaries of Audenarde, called Sts. Cosmus and Damianus, from the XIIth to the XIXth Century. By L. Créteur. After the Researches and Translations from the Archives of the Town of Audenarde, by Th. Devacht.

A very interesting and valuable contribution to the history of pharmacy and medicine, containing many documents and biographical notes and fac-similes of quaint ancient pictures, seals, and of an application for examination in pharmacy, with the official endorsements of the document. The pictures are those of a Sister Beguine from the XIVth century, and of Dr. Jacobus Varentius, Rector Magnificus of the University of Louvain, who died in 1577, and is represented holding in his right hand a large volume and in his left an enormous saw.

Die Naturgeschichte des Cajus Plinius Secundus. Leipzig: Gressner & Schramm.

The ninth part of this German translation by Prof. Wittstein of Plinius'

Natural History has appeared, embracing the chapters on cultivated trees, agricultural products, flax and garden plants, remedies from garden plants, and on flowers and wreaths.

Homœopathy; What Is It? A Statement and Review of its Doctrines and Practice. By A. B. Palmer, M.D., LL.D., Professor of Pathology and Practice of Medicine in the College of Medicine and Surgery in the University of Michigan. Second edition. Detroit: Geo. S. Davis, 1881. 8vo, pp. 109.

A candid and dispassionate review of homœopathy will, doubtless, be of interest to the medical practitioner and to every intelligent person. Such a book we have before us. It is free from mere denunciations and ridicule, but pursues its searching inquiries by the guidance of the writings on this dogmatic system by its founder and his followers.

On the Physiological Actions of Drugs on the Secretion of Bile. By William Rutherford, M.D., F.R.SS.L.&E., Professor of the Institutes of Medicine in the University of Edinburgh. 4to, pp. 130.

A very valuable contribution towards a correct perception of the physiological activity, in the direction indicated, of about fifty drugs, used either alone or together with others, the effects of which had been previously determined. The pamphlet is a reprint from the Transactions of the Royal Society of Edinburgh, vol. xxix.

New Index of Drugs. New York: R. Hillier's Son & Co. 4to.

It gives the Latin and English names, the latter as "pharmaceutical" (*i. e.* those adopted by the pharmacopœia or dispensatory) and common names. It resembles the works previously published by Pollock, Hobbs, Nickell and others, but is less comprehensive than these.

Review of the Drug Trade of New York for the Year 1881. Prepared by D. C. Robbins, Esq., for the Twenty-fourth Annual Report of the Chamber of Commerce of the State of New York. 8vo, pp. 12.

The statistical information furnished in this "Review" is of great commercial, economic and hygienic interest. A number of manufactured articles, which are largely employed, are either not at all or only to a very limited extent imported at the present time, such as tartaric acid and cream of tartar, ammonium and sodium sulphates, sodium, lime and lead acetates, potassium iodide, refined borax, refined camphor, chloroform and others. The amount of opium imported has increased during the past fiscal year to 385,060 lbs., and exceeds the average of the last six years by 46 per cent. In addition to this, 22,358 oz. of morphine were imported, or an excess over the six years' average equal to 144 per cent. An insignificant decrease of 750 lbs. of opium for smoking is noticed, or less than one per cent. as compared with the preceding year. The importation of cinchona barks was over 4,000,000 lbs. and, though nearly equal to the average, was considerably less than in the five preceding years, with the exception of 1877, when only 1,750,000 lbs. were imported. 408,851 oz. of quinine were imported, or over 95 per cent. more than the annual average for six years.

The Recent Tariff Correspondence Relative to the Import Duties on Chemicals. Philadelphia: Keasbey & Mattison.

A compilation of communications and editorials from the New York "Evening Post," the New York "Times," the "Pharmacist and Chemist," the "Oil and Drug News" and the "Monthly Review of Medicine and Pharmacy." The papers relate chiefly to the duty on quinine which, in 1879, was removed by Congress, in our opinion, very injudiciously.

Twenty-first Annual Report of the Philadelphia Drug Exchange. 1882. Pp. 37.

Aside from the affairs of the corporation, several subjects of local and national importance to the drug trade are discussed, among the latter chiefly questions relating to internal taxes and to the tariff.

The Case of Guiteau. A Psychological Study. By Geo M. Beard, M.D. New York. Pp. 36.

Reprint from the "Journal of Nervous and Mental Diseases," January, 1882.

The Study of Trance, Muscle-Reading and Allied Nervous Phenomena in Europe and America. With a Letter on the Moral Character of Trance Subjects and a Defence of Dr. Charcot. By Geo. M. Beard, A.M., M.D., etc. New York, 1882. Pp. 40.

A careful analysis of facts relating to the investigation of the phenomena indicated in the title and suitably illustrated.

Anæsthesia and Non-Anæsthesia in the Extraction of Cataract. With some Practical Suggestions regarding the Performance of this Operation, and Comparative Statistics of Two Hundred Cases. By Hasket Derby, M.D., etc. Cambridge: Riverside Press, 1882. Pp. 32.

The contents of this pamphlet are based upon several short articles which have appeared in the "Boston Medical and Surgical Journal" and in the "Transactions of the American Ophthalmological Society."

Anæsthetics, Medico-Legally Considered. By J. G. Johnson, M.D. Brooklyn, N. Y. Pp. 23.

Reprint from the "Bulletin of the Medico-Legal Society of New York," Dec., 1881.

Soluble Compressed Pellets. A New Form of Remedies for Hypodermic Use, and Applicable to Ophthalmic and General Medication. By H. Augustus Wilson, M.D., etc. Philadelphia. Pp. 4.

From "Transactions of the American Medical Association," 1881.

Fourth Annual Report of the Presbyterian Eye and Ear Charity Hospital. Baltimore, Md. 1882.

Forty-ninth Annual Report of the Managers of the Pennsylvania Institution for the Instruction of the Blind. Philadelphia. 1882.

OBITUARY.

ANTOINE ALEXANDRE BRUTUS BUSSY died at Paris, February 1st, in his eighty-eighth year, having been born at Marseilles, May 10, 1794. He served his apprenticeship in pharmacy in Lyons, and in 1818 went to Paris, at first as Boudet's assistant and afterwards as superintendent of Robiquet's laboratory. In 1821 he became assistant to the chair of chemistry at the Ecole de Pharmacie, and remained connected with this institution in the various capacities of professor, administrator and director until 1873, when he resigned. In 1832 he graduated as doctor in medicine, lectured also for several years on pharmacology, was a member of the Academy of Sciences since 1850, was repeatedly elected president of the Paris Society of Pharmacy and of the Academy of Medicine, and was an honorary member of many learned societios, also of the Philadelphia College of Pharmacy.

The deceased published, conjointly with Boutron-Charlard, a valuable work on the adulteration of drugs, translated into the French language Faraday's chemical manipulations, studied the constituents of a number of drugs, and investigated the mode of preparation and the chemical composition of many elements and compounds; in 1829 he isolated magnesium from its chloride by means of potassium.

Translations of several of his essays and many short notes of his researches have been published in the earlier volumes of this journal.

SIR ROBERT CHRISTISON died, at Edinburgh, January 27th, in his eighty-fifth year, having been born in the same city in July, 1797. In 1819 he graduated as M.D. at the University of Edinburgh, and afterwards continued his studies in London and Paris, receiving in the latter city the instructions of Robiquet and Orfila. Returning to his native city in 1822, he was appointed Professor of Medical Jurisprudence, and seven years afterwards published his celebrated "Treatise on Poisons," the first original work on toxicology written in the English language. In 1832 he succeeded Dr. Duncan in the chair of Materia Medica at the University, and in 1842 published his "Dispensatory," based upon the "New Edinburgh Dispensatory" of his predecessor. He also wrote many memoirs, chiefly on subjects of materia medica and toxicology, a number of which have been republished in the earlier volumes of this journal.

In 1823 Dr. Christison became a Fellow of the Royal College of Physicians of Edinburgh, and from 1838 to 1846 served as its president. From 1857 to 1873 he was a member of the Medical Council representing the medical profession in Scotland. In 1868 he became President of the Edinburgh Royal Society, succeeding Sir David Brewster, was created a baronet in 1871, celebrated his professional "jubilee" in 1872, and resigned his chair in 1877. The deceased heartily sympathized with the efforts made to elevate pharmacy, and for many years was an honorary member of the Pharmaceutical Society of Great Britain, and of kindred societies.

CHARLES ROBERT DARWIN died April 20th, and was buried at West-

minster Abbey, London, April 26th. He was born at Shrewsbury, February 12, 1809, and was educated at the University of Edinburgh and at Cambridge. From 1831 to 1836 he accompanied, as naturalist, the surveying expedition of the ship *Beagle*, and subsequently published several works on the results of his observations. But the one which was destined to attract universal attention, and to be the forerunner of a large class of scientific literature on the philosophical system which has since been termed "Darwinism," was the one published in 1859 under the title "On the Origin of Species by means of Natural Selection, or the Preservation of Favored Races in the Struggle of Life," and which was followed by others, notably, in 1871, by "The Descent of Man and Selection in Relation to Sex." Progressive organic development, or *evolution*, as it is now termed, is an ancient philosophical idea, which at the beginning of the present century was more clearly formulated by Lamarck, but extended by Darwin, and supported with great ingenuity by the results obtained from long years of patient observation and of experimental inquiries, the details of which results are embodied in his later works.

DANIEL BELL HANBURY died at the residence of his son Thomas, at Mentone, on Feb. 12th last, a few days after having completed the eighty-eighth year of his life. He was born Feb. 8, 1794, and was the son of Capel Hanbury and his wife, Charlotte Bell. He was educated at a private school of the Society of Friends, and at the age of fourteen entered the pharmaceutical business at Plough Court, London, carried on by his uncle William Allen, whose partner he afterwards became. In 1824 he married Rachel Christy, who died in 1876, and by whom he had five sons and one daughter, all of whom survive him except the eldest son, the lamented Daniel Hanbury, who died in 1875.

In 1841, at the invitation of Jacob Bell, he took an active part in the organization of the Pharmaceutical Society of Great Britain, serving as a member of the Council from the first, and as treasurer from 1852 to 1867, when he resigned. In 1868 he retired from business.

An obituary notice of the deceased in the "Chemist and Druggist" for March closes with the following remarks, which are also applicable to several of the older sections of the United States:

"A glance round the noted chemists' businesses which date from the early part of this century shows a very large proportion which were established and conducted by members of the Society of Friends. The fact that men of that class have had a genius for making pharmacy a success carries its lesson on the surface, and it may be thought of sometimes now-a-days. Patience through the days of small things, and the strictest integrity in all circumstances, have been the characteristics which have won for them so enduring a share of public confidence. They have not been men who ground their lives away in the determination to make a business; far from that. A dozen names will suggest themselves of Quaker druggists who have been at least as noted in the philanthropic as in the pharmaceutical world. Our age needs more of their old faith in principle applied to every-day business, which alone has insured enduring success, or, if not, can at least make failure honorable."